

AUGUST, 1944

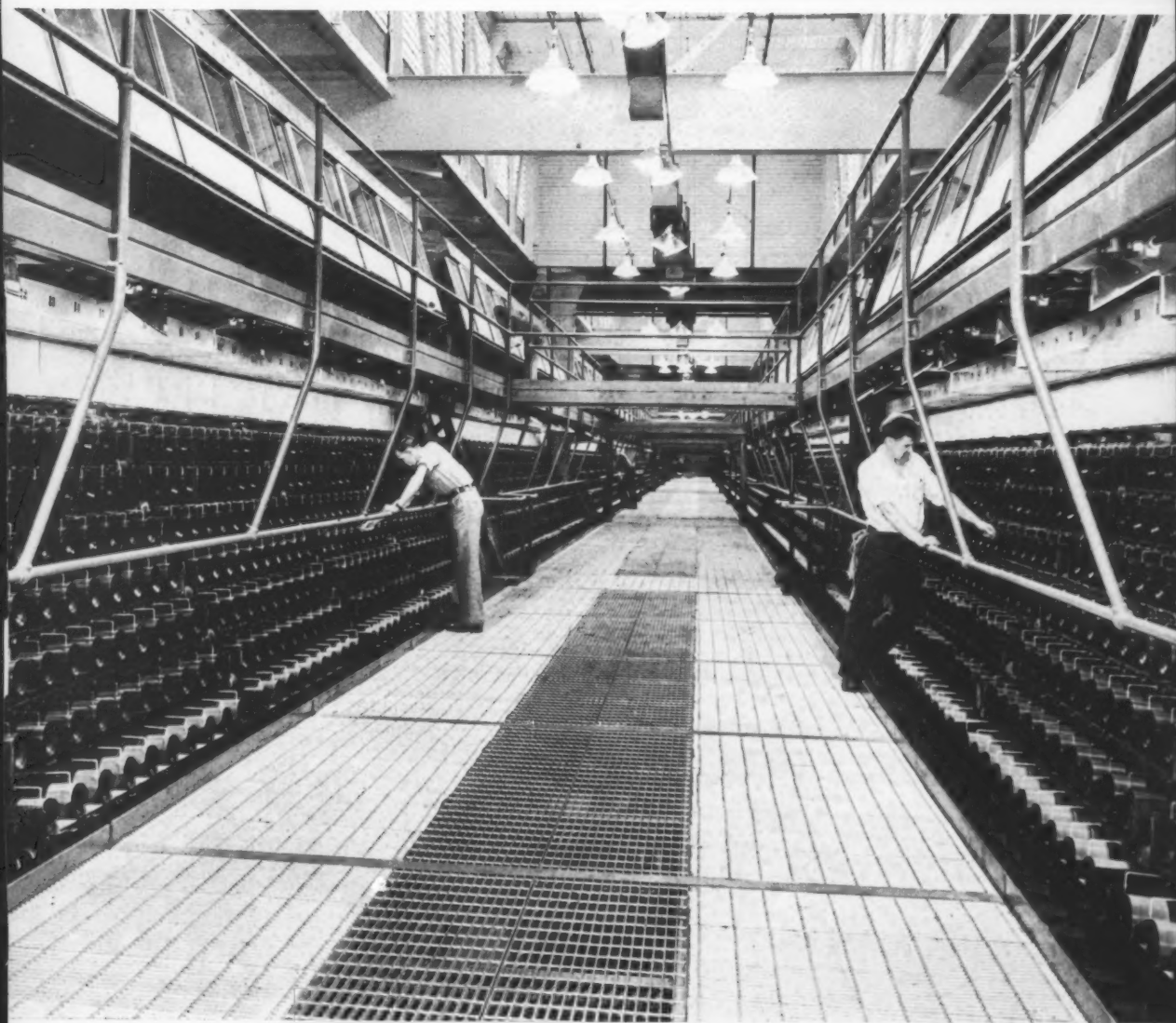
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THE

INSTALLATION
MAINTENANCE
MERCHANDISING

Industry

AIR CONDITIONING
MACHINERY



Your Subscription to this National Magazine is by Compliment of

UNITED REFRIGERATOR SUPPLY CO.

366 S. MAIN ST. • MEMPHIS TENN.

Valves for all refrigeration purposes!

The Weatherhead reputation in the refrigeration field has long been due to the practical engineering with which we endow the many products we make for this industry. Our line of refrigeration valves has been designed and engineered by Weatherhead men who have gone into the field and studied each product in scores of routine uses. As a result, Weatherhead refrigeration valves embody numerous refinements which, coupled with our years of production know-how, make them the first choice of seasoned refrigeration designers and engineers for both domestic and commercial units.



Look Ahead with



Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND, OHIO
*Manufacturers of vital parts for the automotive, aviation,
refrigeration and other key industries.*

Plants: Cleveland, Columbia City, Ind., Los Angeles
Canada—St. Thomas, Ontario



Par Model HA-3

- A husky $\frac{1}{3}$ H.P. 2 cylinder air cooled unit designed for commercial display cases and large reach-ins.
 - Embodies the 28 outstanding PAR features, including large condenser . . . slow speed . . . and fast pump down.
 - Equally efficient for self contained or remote applications.
- Standard equipment includes controls.

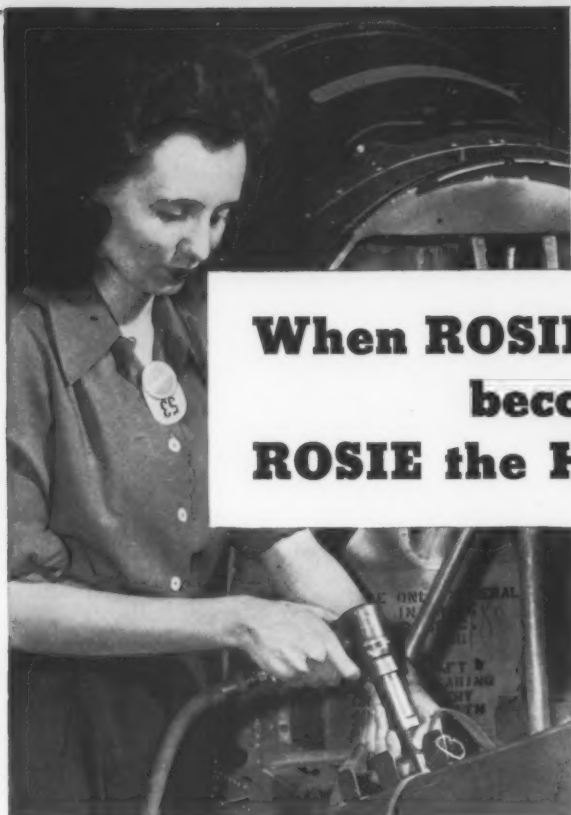
● Write for illustrated brochure of details.

● BY COMPARISON—YOU'LL BUY PAR.

PAR Division

LYNCH

MANUFACTURING
CORPORATION
Defiance, Ohio, U.S.A.



When ROSIE the Riveter becomes ROSIE the Housewife...



Right now her big job is to help build airplanes that will knock the Axis off the map. As she rivets, a refrigerator, maintaining rivet temperatures at minus 10 to minus 40 degrees, according to requirements, is within easy reaching distance. It is filled with ice box rivets that were first heat treated to make them soft enough to be driven satisfactorily. After quenching in water they were placed in this low temperature refrigerator to prevent their hardening and cracking when being driven.

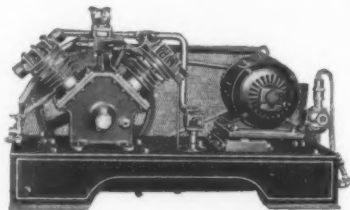
When Rosie becomes a housewife, she will go to her quick freeze unit, whether it be in her own home or in a public locker plant, take out some frozen *fresh* strawberries that had been quick frozen at -30° to -40° and then stored at zero to $+5^{\circ}$. She'll have them for dessert, even though there be a blizzard outdoors! They will be the berries she put there the previous berry season. There will also be countless other things in that quick-freezer that will help eliminate the problem of what to serve when unexpected guests arrive for dinner.

One of the important reasons for this double-duty application of low temperature refrigeration that makes possible this advance in airplane production and new

comforts and conveniences in our every day existence, is an efficient, specially designed and engineered Brunner low-temperature refrigerating condensing unit.

The lessons we are learning in today's production of refrigeration condensing units essential to the winning of the war, will be applied to good advantage in the production of more efficient peacetime equipment for the home, the farm and for the food distributor.

Our engineers, experts in the commercial or industrial application of refrigeration and air conditioning, will gladly discuss your problems. Why not write *today!* Brunner Manufacturing Co., Utica, N. Y., U. S. A.



**MUELLER
BRASS CO.**
PORT HURON,
MICH.

**ORDER FROM
YOUR JOBBER**

MADE IN U.S.A.

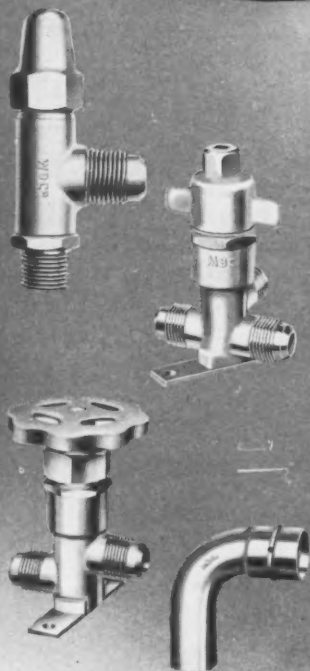
**YOUR
JOBBER
IS YOUR
BUSINESS
FRIEND**

Our policy for many years has been to distribute our goods on a selective jobber plan. Our experience has shown us that this policy is a sound one. It achieves for us a nation-wide distribution at the lowest possible cost. This lower cost naturally benefits not only us but also the jobber, service man and contractor.

The jobber has a distinct and important service to perform in the distribution of goods. We believe that through the services he renders, the goods actually reach the ultimate buyer at a lower cost rather than a higher one, and that selling goods direct does not reduce the cost to the eventual consumer. As manufacturers we know that if we sold direct, we would require billing, accounting and shipping forces ten to twenty times greater than what we have at present. Our transportation charges would increase tremendously; our storage space would have to be greatly enlarged. These things and many more would necessarily reflect themselves in the cost of the product.

Our post-war distribution policy will be on the same basis as it has been for many years prior to the war—distributed on a selective jobber plan. We will sell only enough jobbers in a locality to assure complete coverage of territory and trade. All trade inquiries will be referred to the jobber.

We will carry a complete line and assume undivided responsibility for—line valves, compressor valves, receiver valves, driers, heat exchanger, liquid indicators, fittings, both flare and solder type, hard drawn solder sealed copper pipe, dehydrated tubing.



MUELLER BRASS CO.
PORT HURON, MICHIGAN

*I believe in going to a Specialist for
anything I need - That's why I prefer*

ROTARY SEALS

*They are made by
Specialists!*



● For over 16 years we have devoted our entire productive efforts to the manufacture of mechanical shaft seals.

Whether for original equipment or replacement units, every phase of this highly specialized business has had our closest attention. ROTARY SEALS are all that we manufacture and they had to be good to win the outstanding reputation for quality which they enjoy today.

Sales of
ROTARY SEALS

HAVE SHOWN AN AVERAGE INCREASE OF

77%

PER YEAR
IN THE PAST
8 YEARS



ROTARY SEAL COMPANY

2020 North Larrabee St. • Chicago 14, Ill.

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THE SYMBOL OF
Modern
REFRIGERATION
CONTROL

The name HONEYWELL is first a symbol, identifying controls and control systems for the refrigeration industry. The importance of this symbol is dependent upon two tests—first, the *performance* of these controls and control systems; secondly, the ability of the manufacturer to *anticipate* and meet the needs of the refrigeration industry.

HONEYWELL has proved itself under both requirements. The dependable per-

formance of M-H controls is known and accepted by refrigeration engineers everywhere. The many different controls adapted to war-time needs of the refrigeration industry are typical of Honeywell's ability to meet changing demands. Remember, Dependable Controls Cost Less than Service.

Minneapolis-Honeywell Regulator Co.,
2909 Fourth Avenue South, Minneapolis
8, Minnesota. Branches in principal cities.

THE POLARTRON SYSTEM OF
FROST-FREE REFRIGERATION

MINNEAPOLIS
Honeywell
CONTROL SYSTEMS



USE A "Y" STRAINER for Large Capacity and Long Service

Due to its features of design the Henry "Y" Strainer not only gives complete protection to condensing unit and control equipment against scale and foreign matter that may be present in the system, but it also permits easy servicing with a minimum of interruption to plant operation.

The Henry "Y" Strainer, like other Henry products, has become the choice of the Army, Navy, Maritime Commission and those who serve the refrigeration and air conditioning industry in time of peace as well as in time of war.

7 Reasons Why You'll Like It Best!

- 1 Light in weight — due to its tubular construction.
- 2 The strainer screen can be easily and quickly cleaned without removing the strainer from the line.
- 3 "Wave-Flow" design results in negligible pressure drop.
- 4 Cleaning seldom necessary because of large screen area.
- 5 Internal baffle prevents injury to the heavily reinforced monel screen. In this connection it is well to remember that suction velocities may exceed 5,000 feet per minute.
- 6 Patented forged steel clean-out flange is distortion-proof, making a tongue and groove anchored-gasket joint with strainer body.
- 7 Strainer is of welded steel construction. Rustproofed.

Available in $\frac{1}{2}$ " to 3 $\frac{1}{2}$ " O.D.S. sizes and in 1" to 3" F.P.T. sizes with screen area ranging from 23 to 175 square inches.

FOR SUCTION OR LIQUID LINES



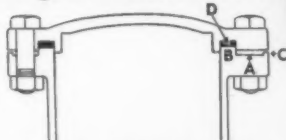
The Henry "Y" Strainer when used in suction line service will not trap oil if the strainer is installed on its side as shown. 50-mesh screen is recommended for suction lines.



For liquid line service the Henry "Y" Strainer can be installed either in a horizontal or vertical position. 100-mesh screen is recommended for liquid lines.



Why the Patented Henry Flange Is Distortion Proof



Strains due to uneven or excessive tightening of bolts are absorbed in the recessed area (A) and cannot be transferred to the flange gasket face (B) made up of the inner flange rim and the strainer housing to which the flange is welded. Lip on outer flange rim (C) acts as a "stop" to prevent excessive drawing up of bolts. Gasket is located in recessed area (D). Flange makes tongue and groove anchored-gasket joint with strainer.

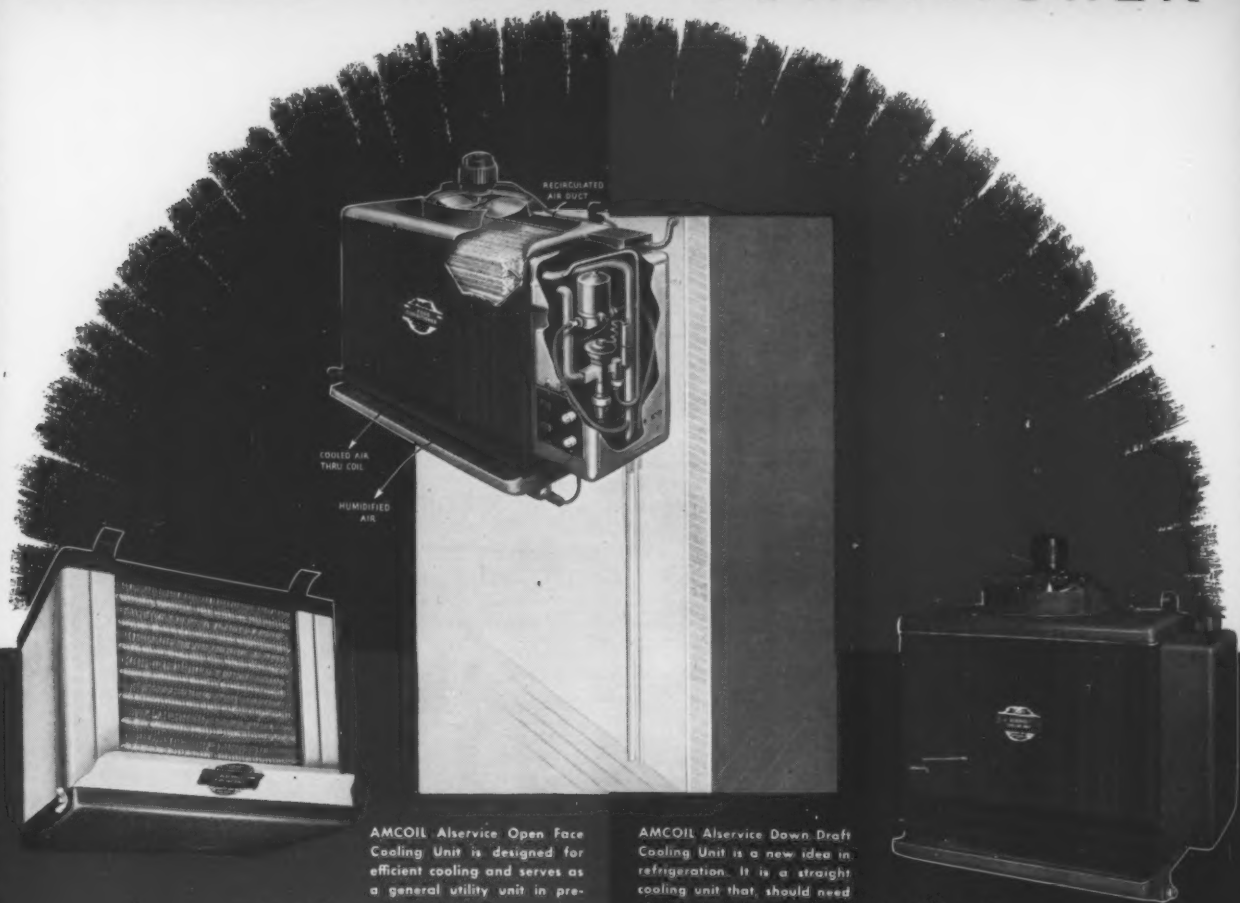
HENRY VALVE Company

3260 West Grand Ave.
Chicago 51, Illinois

SOLD BY LEADING
JOBBER EVERYWHERE

PACKLESS AND PACKED VALVES • STRAINERS • DRYERS FOR REFRIGERATION AND AIR CONDITIONING
AMMONIA VALVES • FORGED STEEL VALVES AND FITTINGS FOR OIL, STEAM AND OTHER FLUIDS

AMCOIL FOOD CONDITIONER



AMCOIL Alservice Open Face Cooling Unit is designed for efficient cooling and serves as a general utility unit in preserving foods and other commodities where a forced draft cooling unit is required. Streamlined design, in attractive grey and black color scheme, it can produce temperatures down to 34° F.

AMCOIL Alservice Down Draft Cooling Unit is a new idea in refrigeration. It is a straight cooling unit that, should need for humidity control arise, by the addition of certain parts, the unit is converted into a cooling and high controlled humidity FOOD CONDITIONER with all the advantages of that equipment.

BUILT TO ADVANCE REFRIGERATION STANDARDS

Answering Industry's Demand FOR A PRACTICAL, DUAL-PURPOSE UNIT

"Give us a compact food preserving unit that combines high, controlled humidities with refrigeration. AMCOIL SAYS "HERE IT IS" to such a demand with its new FOOD CONDITIONER, now available for immediate shipment under certain priority ratings.

This FOOD CONDITIONER is more than a unit cooler, combining as it does temperatures from 35° F. to 40° F., and high, controlled humidities up to 85%. This double accomplishment preserves foods *without* dehydration, and is made to be used in Walk-In boxes. It protects stored meats, fruits and vegetables, perishable foods, butter and cheese, eggs, flowers, bakers' and confectioners' products—and is practical for retarding dough.

ONE HUNDRED MILLION FOR REPLACEMENT

Government agencies estimate that this year will see sales of commercial refrigeration equipment for replacement reach a total over \$100,000,000. AMCOIL engineered units may be purchased on rated orders of AA5, or better under L-38*. Inquire NOW how you can get your share of this business.



AMERICAN COILS CO.

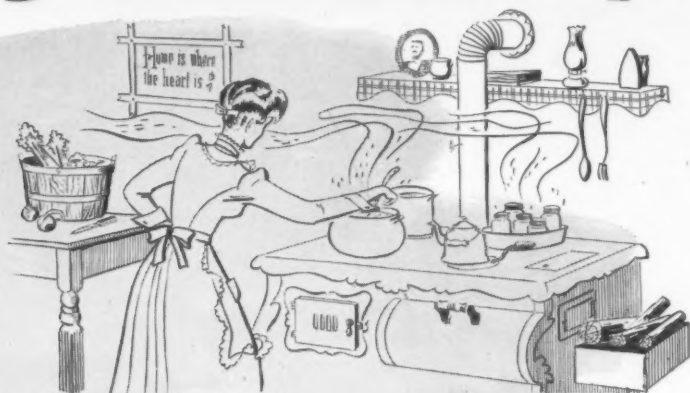
25-27 LEXINGTON STREET - NEWARK, N. J.

Factory Representatives

P. J. BURRILL, 800 North Clark Street, Chicago, Illinois
FRANKLIN G. SLAGEL, 1501-1509 W. 8th St., Los Angeles, Calif.

* IMMEDIATE SHIPMENT NOW FROM LOCAL JOBBERS OR DIRECT FROM US

"Canning" Postwar Style



GENERATIONS of women have suffered in the summer heat to preserve fruits and vegetables for the family—to spread the abundance of summer into the scarcity of winter.

After the war, a new method of preserving will be widely available—one that involves no inferno of steamy kitchen at the hottest season of the year.

Quick freezing—cold preserving in home cabinets—lockers—and in food factories is the modern method. Developed just before the war, it has proved its value in thousands of homes—is ready for the millions in the postwar period.

At home, the housewife can package fruits, vegetables, meats—place them in a chilling cabinet—leave them to quick freeze, to remain frozen until used. Their day-old freshness preserved, they are far better, more palatable foods. Food preservation need not be a dreaded task of heat and steam.

At the stores—an abundant variety of similarly frozen foods—quick frozen at the peak of their flavor.

Detroit Refrigeration Controls and Expansion Valves which today are enlisted in the war effort, tomorrow will be ready to further this revolution in good eating.

DETROIT LUBRICATOR COMPANY

General Offices: DETROIT 8, MICHIGAN

Division of AMERICAN Radiator and "Standard" Sanitary Corporation

Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG



"DL" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • Radiator Valves and Balancing Fittings • Arco-Detroit Air and Vent Valves • "Detroit" Expansion Valves and Refrigeration Accessories • Air Filters • Stationary and Locomotive Lubricators

Fast, Expert Service on GENUINE UNIVERSAL COOLER PARTS From These Authorized Jobbers



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Allentown, Penna.
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Atlanta, Ga.
3. Parks & Hull Appliance
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1035 Cathedral St.
Baltimore, Maryland
4. W. A. Case & Son Mfg.
Co.
1 Lewis St.
Binghamton, N. Y.
5. Auto Service Co.
1916 Fourth Ave.
Birmingham, Ala.
6. Appliance Engineering
Corp.
701 Beacon St.
Boston, Mass.
7. Root, Neal & Co.
64 Peabody St.
Buffalo, New York
8. Air-Conditioning &
Refrigeration
Supplies, Inc.
Broad & Peckmont
Charleston, West Va.
9. Henry V. Dick & Co.
1513 Camden Road
Charlotte, N. C.
10. Peglar Machinery Co.
Cowart & 16th St.
Chattanooga, Tenn.
11. Automatic Htg. &
Cooling Supply
647 W. Lake St.
Chicago, Ill.
12. Automatic Htg. &
Cooling Supply
809 W. 74th St.
Chicago, Ill.
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1220 Jackson
Cincinnati, Ohio
14. Refrigeration Supplies
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Cleveland, Ohio
15. Henry V. Dick Co.
703 Main St.
Columbia, S. C.
16. Mason Supply Company
602 N. 4th St.
Columbus, Ohio
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Dallas, Texas
18. Republic Elec. Co.
114 E. Front St.
Davenport, Iowa
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Supply
1524 Fifteenth St.
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Supply
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Detroit, Michigan
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Elmira, New York
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Cooling Supply
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730 N. Saginaw St.
Flint, Michigan
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Supply
1012 Jennings at 12th
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27. Husco, Inc.
714 Market St.
Greensboro, N. C.
28. Marsden & Wasserman,
Inc.
44 Hicks St.
Hartford, Connecticut
29. Standard Brass & Mfg.
Co.
2018 Franklin St.
Houston, Texas
30. F. H. Langenkamp Co.
229 E. South St.
Indianapolis, Ind.
31. Bowen Refrigeration
Supply, Inc.
917 W. Bay St.
Jacksonville, Fla.
32. Parslund Pump &
Machinery
1717 Main St.
Kansas City, Mo.
33. Lohmeyer Engineering Co.
313 W. Cumberland Ave.
Knoxville 5, Tenn.
34. Ruegg Refrigeration
Supply
245 E. Eleventh St.
Lincoln, Nebraska
35. Wickham Supply Co.
1512 N Street
Lincoln, Neb.
36. Refrigeration Service,
Inc.
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Los Angeles, Calif.
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402 E. Market St.
Louisville, Ky.
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Cooling Supply
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Maywood, Ill.
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New York City, N. Y.
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Co.
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Oakland, Calif.
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Copper
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Oklahoma City, Okla.
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Raleigh, North Carolina
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2434 University Place
St. Paul, Minn.
61. Hinshaw Supply Co.
1316 J Street
Sacramento, Calif.
62. J. Geo. Fischer & Sons
Lapeer at Second
Saginaw, Michigan
63. United Refrigeration Co.
112 Marinas
San Antonio, Texas
64. Wright Refrigeration
Service
1537 India St.
San Diego, Calif.
65. California Refrigerator
Co.
1077 Mission St.
San Francisco, Calif.
66. Cyclops Iron Works
837 Folsom St.
San Francisco, Calif.
67. Murray Supply Co.
834 State St.
Schoenectady, New York
68. Bowen Refrigeration
Supply, Inc.
323 Spring St. N. W.
Atlanta 3, Georgia
69. Central Service Supply
Co.
209 Jefferson Ave.
Scranton, Penn.
70. F. H. Langenkamp Co.
143 E. LaSalle St.
South Bend, Indiana
71. Springfield Refrigeration
Supply
223 E. Adams St.
Springfield, Ill.
72. Hoffman Supply Co.
810 Boonville Ave.
Springfield, Mo.
73. Central Service Supply
Co.
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Syracuse, New York
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Supply Co.
1123 Florida Ave.
Tampa, Florida
75. Heat & Power
Engineering Co.
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Toledo, Ohio
76. Machine Tool & Supply
Co.
215 E. 151 St.
Tulsa, Okla.
77. Refrigeration Supply Co.
1612 14th St., N. W.
Washington 9, D. C.
78. Refrigeration Supplies
Distr.
25 Essex St.
Youngstown, Ohio
79. Refrigeration Service &
Supply Co.
1105 Kapitol Blvd.
Honolulu, T. H.



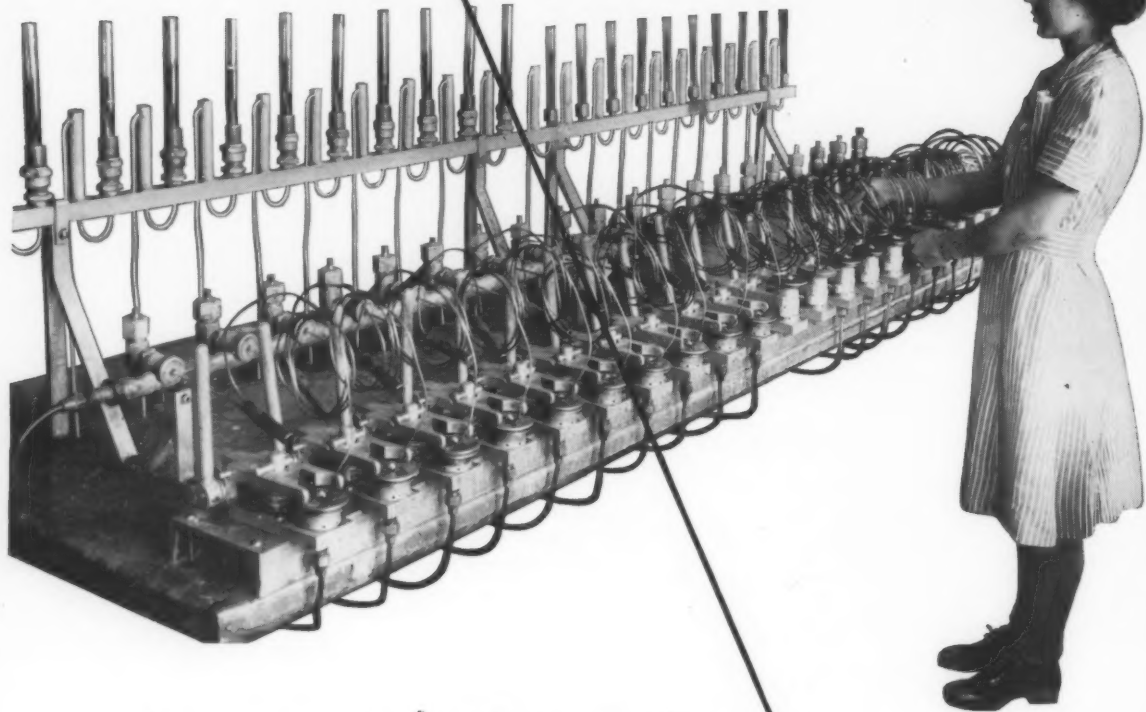
**BUY
WAR BONDS
AND KEEP
THE BONDS YOU BUY**

UNIVERSAL COOLER

UNIVERSAL COOLER CORPORATION • Automatic Refrigeration since 1922
MARION, OHIO • BRANTFORD, ONTARIO

here's a preview

of Trouble-Free Thermo Valve Performance



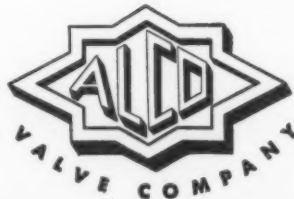
Don't wait for troubles to develop... stop them before they start. That's the policy behind the many exacting tests of Alco Valves.

For instance, the row of test fixtures shown above, designed by Alco engineers, shoots compressed air into the capillary tubing and against the diaphragms of Thermo Valves at pressures up to 200 pounds. Any potential leak of the final refrigerant charge will show up as air bubbles in the column of liquid.

Every Alco Valve passing this test... and every one must pass it before being shipped... can be depended upon to handle normal pressures easily over long periods of service. They'll give faithful performance under all conditions. Alco Valve Company, 843 Kingsland Avenue, St. Louis 5, Missouri.

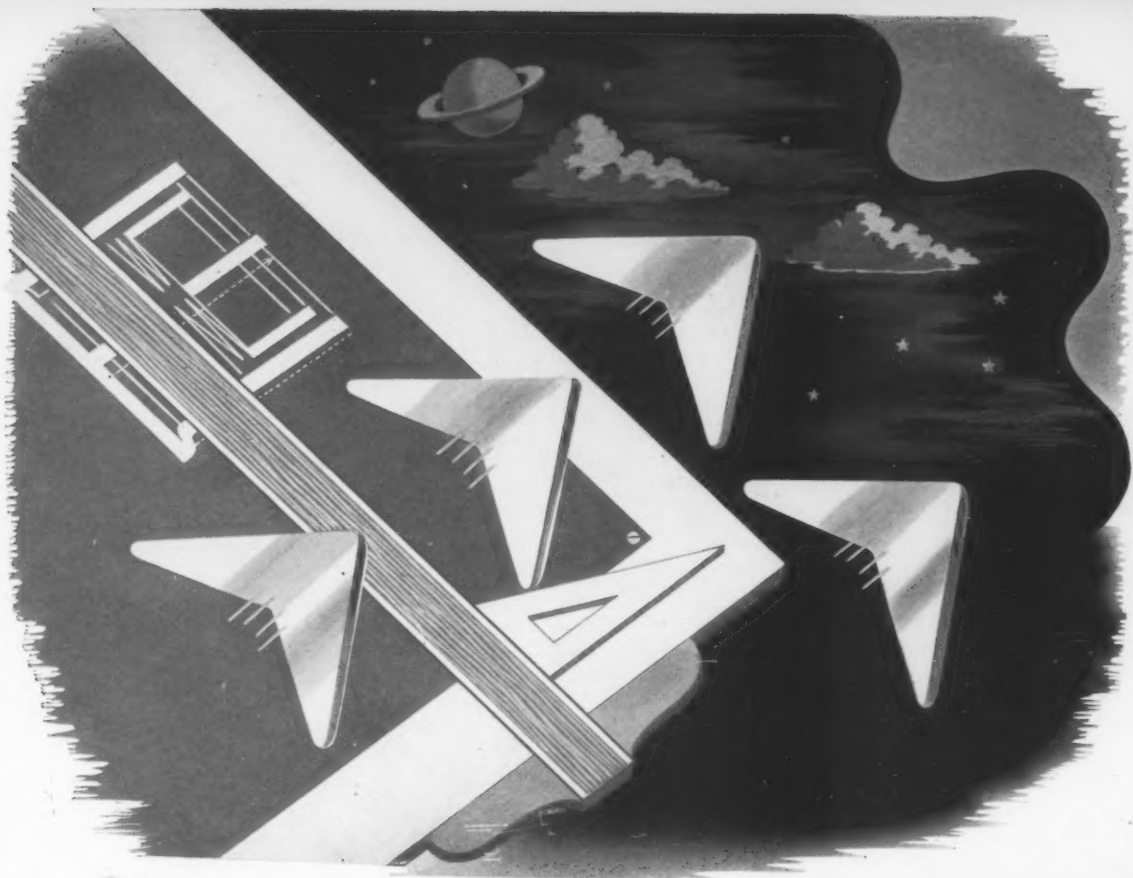


NOW, MORE THAN EVER, BUY BONDS

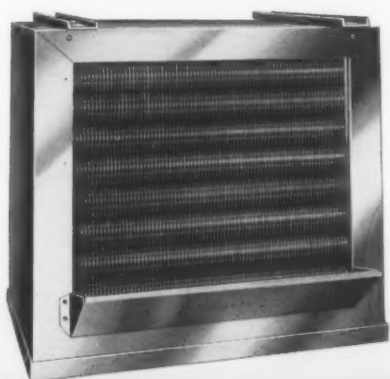


Designers and Manufacturers of Thermo-static Expansion Valves; Pressure Regulating Valves; Solenoid Valves; Float Valves.

THE REFRIGERATION INDUSTRY



IT'S AS MODERN AS *Tomorrow*



Defrost with ordinary tap water in less than five minutes! Easy to install. Easy to service. No complicated electrical devices . . . no solenoid valves . . . no brine systems to run up cost and cut down profit. Bush Water-Defrost Unit Coolers are unexcelled for low temperature (below 32 degrees) work . . . have insured their efficiency with sound engineering and thorough testing.



BUSH MANUFACTURING CO.

HARTFORD CONN · 415 LEXINGTON AVENUE NEW YORK · 549 W. WASHINGTON BLVD. CHICAGO

**You'll do faster flaring
with a SLIP-ON YOKE!**



Just slip yoke over bar.



A slight turn holds it in place.

The No. 195-F Imperial Flaring Tool with the Slip-on Yoke has made a great hit with refrigeration men everywhere.

The illustrations show how easy it is to use. The yoke is made so that it slips right over the bar instantly without twisting or turning. Inside edges of the yoke are slotted so that once in position a slight turn holds it in place.

If you haven't used one you will be

surprised how this improvement speeds up flaring.

The No. 195-F Flaring Tool makes correct 45° flares on 1/4", 5/16", 3/8", 1/2" and 5/8" O.D. soft copper, brass or aluminum tubing to make up leakproof SAE flare joints.

If your Jobber cannot supply you with one of these flaring tools from stock he can secure it for you in a short time.

THE IMPERIAL BRASS MANUFACTURING CO., 536 South Racine Ave., Chicago 7, Illinois.

IMPERIAL

FITTINGS • STRAINERS • DEHYDRATORS • VALVES • FLOATS • CHARGING LINES
TOOLS FOR CUTTING, FLARING, BENDING, COILING, PINCH-OFF AND SWEDGING

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Refrigeration
Industry*

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The Refrigeration INDUSTRY

C O N T E N T S

THE COVER . . . Miles of continuous spinning machines turn out rayon yarns for use in tires, cargo chutes, tow targets, and other war products. Temperature control is vital in many phases of rayon manufacture. Photo courtesy Industrial Rayon Corp., Cleveland.

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All material and data presented in this issue has been reviewed by the necessary Services censorship divisions.

The paper for this magazine comes within the legal quota limits as established by the War Production Board.

Water gives LIFE to the goldfish but it's DEATH on sliding parts

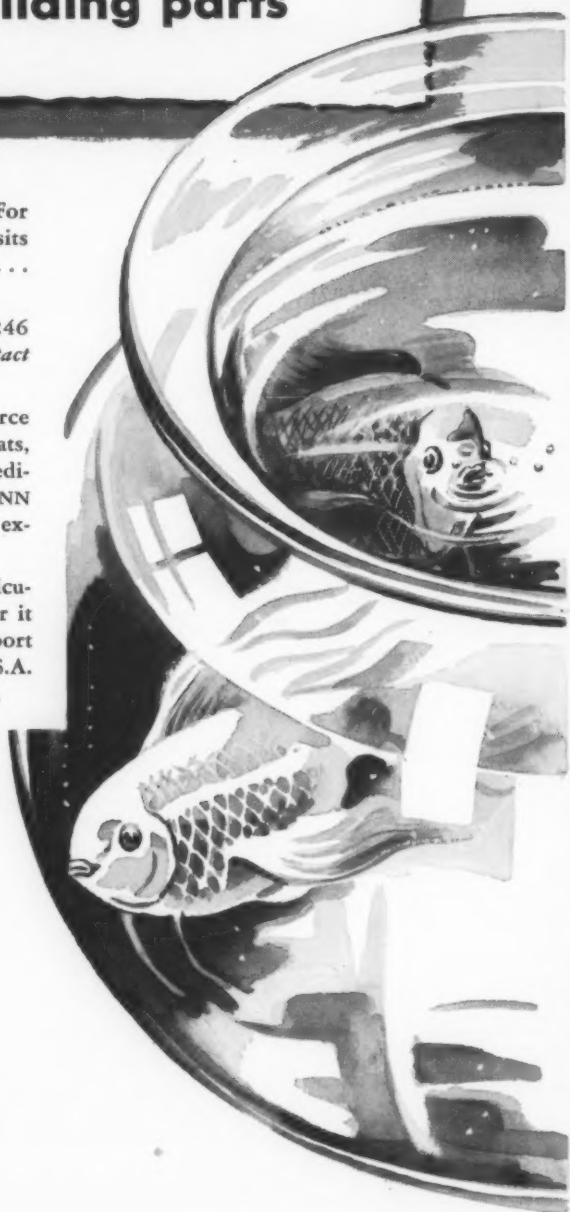
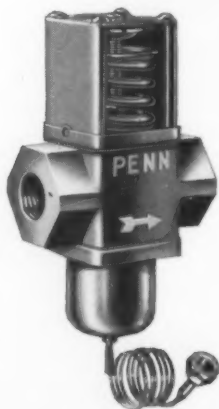
WATER regulators just don't "take to water." For water means rust and corrosion. Worse, the deposits made by water are of a particularly abrasive nature . . . they're *death on sliding parts*.

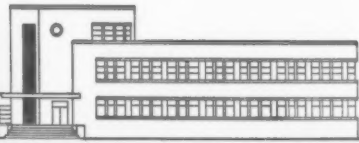
That's why PENN designed the new Series 246 Water Regulator so that *no sliding parts are in contact with water*.

Thus PENN has eliminated the most common source of water valve trouble. There is no sticking of seats, no rusting of range springs, no corrosion and sedimentation on sliding parts. What's more, the PENN 246 *puts a stop to water hammer* . . . yet the valve is extremely sensitive to head pressure changes.

A free copy of Bulletin R-1986, giving full particulars on this new valve, is waiting for you. Ask for it today! *Penn Electric Switch Co., Goshen, Ind.* Export Division: 13 East 40th Street, New York 16, U.S.A. In Canada: Powerlite Devices, Ltd., Toronto, Ont.

- No water hammer
- No sticking of seats
- No rust or sedimentation on sliding parts
- Valve can be flushed manually
- No drain plug — yet freezeproof
- Two styles — flanged & threaded



PENN 
AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

HOUSEHOLD UNITS

WASHINGTON sources say there's a better-than-even chance of production of mechanical refrigerators and other household appliances within the next few months, if the European phase of the War ends "on schedule." Shortage of small motors, however, would hold back any production for at least three months; when that situation eases, WPB may be expected to push for a limited resumption of production, these sources say. Don't look for any changes in present conditions, however, until the war with Germany is over.

INDUSTRY PLANNING

ELEVEN "task committees" named by the Refrigeration and Air Conditioning Industry Advisory Committee are now studying various segments of the industry with a view to determining future needs and problems.

Segments of the industry being studied include: home freezers; farm freezers; commercial frozen food storage and dispensing cabinets; soda fountains, fountainettes, salad and sandwich units, and refrigerated backbars; ice cream cabinets; water coolers; unit air conditioners; walk-in and reach-in coolers and display cases; bottled beverage coolers and vending machines; bulk beverage dispensing and vending coolers and equipment; frozen food locker plants.

When the task groups have finished, WPB should know: (1) what the industry's products are and where they are used; (2) the relative urgency of demand for replacement items; (3) data on number of products now in use, life-expectancy figures of equipment, and an estimate of over-age equipment now in use; (4) listings of all manufacturers; (5) 1940 all-industry production figures; (6) minimum replacement requirements; (7) bills of materials per unit, and (8) man-hour labor requirements per unit, both skilled and unskilled.

CMP—9A CHANGES

PROCEDURES established for use by repairmen under CMP Regulation 9A in obtaining materials may be used to procure only three types of copper or copper base alloy tubing or pipe from brass mills or brass mill warehouses, WPB has ruled.

Also, a quarterly limit of 2000 pounds of copper tubing has been imposed on amounts of this material which one distributor may sell to another distributor.

The three types of copper tubing which repairmen may obtain from brass mills or brass mill warehouses are:

(1) Seamless copper tubing soft in coils or in straight lengths of an O.D. (outside dimension), gauge and type commonly sold as automotive tubing;

(2) Seamless copper tubing soft in coils in gauges .032" and .035" and of an O.D. and type commonly sold as refrigeration tubing, and

(3) Seamless copper tubing soft in coils 1/2" or 3/8" O.D. x .049" gauge for oil burner service.

Orders which bear the allotment symbol V-3 may not be accepted by any mill or warehouse unless they are for one or more of these types of pipe or tubing.

WITHHOLDING TAX

EMPLOYERS will have to revise their withholding system, use new tax tables, and get a new list of exemption claims from employees under the new procedure in paying taxes, resulting from the simplification plan recently adopted.

No change in withholding procedure will be necessary until the new rates go into effect on January 1, 1945. The new withholding tax will apply on the first pay day in 1945.

By December 1, employers must secure from each employee, a new statement of the number of persons for whom he claims exemption as dependents.

It appears to be the purpose of the simplification plan to withhold as nearly as possible, the exact amount of tax owed on salaries and wages up to \$5,000. The withholding covers the employee's surtax and the new 3% normal tax which replaces the old victory tax.

NEW HIRING RULES

THERE are three basic requirements in the new "Priority Referral Plan" which went into nation-wide effect July 1:

1. Practically all hiring will have to be done through U. S. Employment Service.

2. Employment ceilings will be established for each organization, above which new personnel cannot be added.

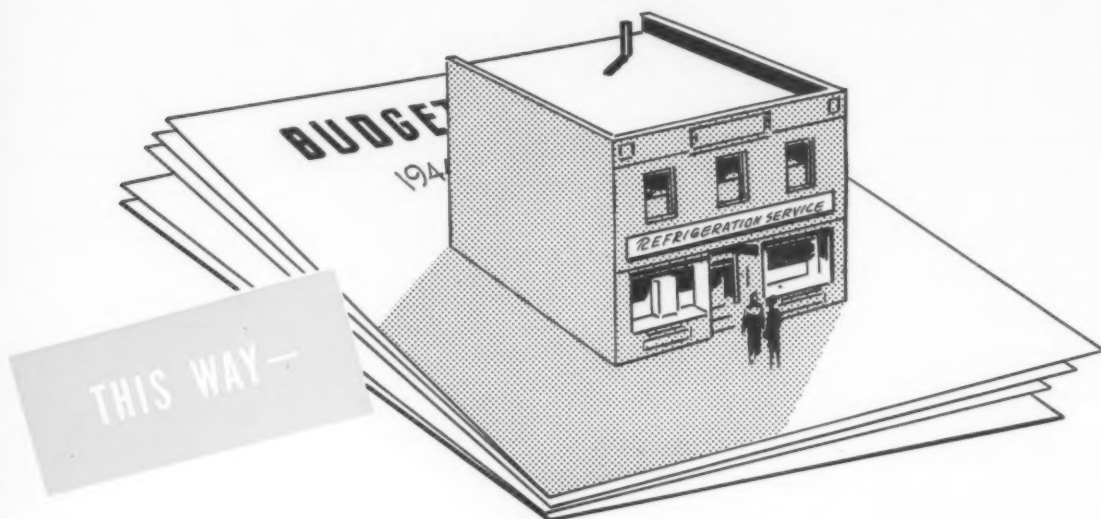
3. A "priority rating" as to essentiality of service rendered will be assigned to each establishment and workers will be allocated first to the higher priority ratings.

Until August 31, employment ceilings are based on the number of employees during the two weeks' period from May 15 to June 1. However, returning War Veterans who are taking their first back-from-service job are not covered. These men may be hired without referral through USES, and officially they do not enter the employment ceiling during the first 60 days of their employment. Part-time workers employed less than 30 hours a week also do not count.

There appear to be two things the refrigeration employer can do to safeguard his interests: (1) if there

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BUILD YOUR BUSINESS



"WITH all the work I can handle, what's the use of budgeting business operations today?" asks Bill Black, owner of a refrigeration service company. "I could do more business if I could get the right help and more of it, more parts and servicing equipment, but I can't. So what's the use of setting up a sales quota beyond my capacity to produce under present restrictions, a quota that I might have a chance of making in normal times, but not today?"

Bill has the same mental stance on budgeting as many others handling refrigerator repairs, maintenance, installations and sales. He does not realize that, whether a buyer's or a seller's market, the budget is the keystone of cost accounting, and he can't acquire maximum cost control unless he forecasts operations.

Like many others on the retail end of this industry, Bill assumes that a budget is only an incentive to bigger sales, that by setting the goal high, a bigger volume will be achieved, when another consideration, equally important, is estimating the over-all cost of operation, so that you can determine whether the volume you expect to sell will be profitable.

The budget is just as helpful in controlling costs on sales and service, to get maximum profit in times of capacity volume, as it is in building

By Fred Merish

volume in hard times. The assumption that a budget is only a sales booster is erroneous. It is a cost-controller, too.

There are five reasons why the refrigeration dealer and service man should budget today:

1. To help analyze managerial efficiency after operation. You forecast the main elements of operation for a forthcoming period and then compare results with these planned estimates. The necessity for forecasting sales, cost of sales, overhead and net profit for a forthcoming period is much greater today than in prewar times, for the individual businessman as well as for the corporation. Many in this industry pass up this important operating chore, and we want to emphasize the need for budgetary preparation from now on. You can't do a good managerial job without it.

2. To aid in preparing a forecast of tax payments. Now that the tax is on a current year's basis, the dealer or serviceman must pay within the year. This necessitates estimating the tax and then settling up after the year for any difference.

The individual businessman may base his estimate on last year's fig-

ures, to safeguard himself against a penalty, but this may throw his spendable profit far out of kilter—because there may be a big difference between last year's tax and the current year's tax. Net profit means little unless the tax is considered. It is just as unwise to appraise current spendable profit on the basis of last year's tax expense as it is to use any other expense of a prior year when analyzing current overhead.

3. Business will experience many abrupt changes of pace from now on. Unless the dealer or serviceman budgets, he will be unprepared for such deviations. "Business as usual" is a dead pigeon these days.

4. To give the businessman some idea of spendable profit. In the postwar period, servicemen and dealers will want to modernize, expand and promote their business aggressively to get their share of heavy postwar volume, and this will require capital. If they base such investments on income as they earn it, without deducting the income tax for the current period, they may invest more than they should in postwar plans, thus endangering their working capital, or "seed money."

Many businessmen assume that all investments in business betterment

Profits in the Post-War Period Will Go to the Dealer Who Starts His Planning Now. This Article Tells Why and How.

pay dividends. Heavy capital investments mean heavy fixed charges, in addition to big initial outlays. If this drain undermines the working capital, you may lose out on postwar modernization and other improvements.

Remember that the returns on postwar modernization must be considered, not in terms of the net profit on sales, but in accordance with the spendable profit after taxes. This means that your postwar program must pay bigger dividends than ever before to assure the same pocket-profit as in prewar years. The best way to attain this objective is to budget.

Because of the tremendous opportunities for refrigeration volume in sales and service after war's end, members of this industry should get substantial returns on modernization, even with a high tax. **Don't fail to estimate your tax for the year to come, whether you use this estimate in reporting to the government or base your return on the previous year's income.** And to estimate your tax with any degree of accuracy, you must budget. The high tax is compelling all businessmen to do a good managerial job if they expect to net reasonable profits. This means better recording practices, particularly in the costing of repairs and installations.

5. You can't cost current sales accurately without a budget. This is a fundamental principle of cost accounting that few refrigeration servicemen understand. All well managed concerns using budgets recognize that, without a systematic plan forecasting future operations, they cannot attain maximum cost control. Cost accountants agree with this viewpoint.

The cost trend is upward today, so obviously it pays to head off a loss by anticipating this upswing by means of a budget, and managing your affairs to make a profit accordingly. Otherwise, you are gearing current

operations to yesterday's costs, which were, in all probability, lower. With the continuance of instability in the postwar period, costs should keep in the same state of flux. Even if the trend drifts downward, the budget is still an essential to maximum cost control.

Without a budget, you only record your costs and analyze them afterward against prior-period figures. You can't place total reliance on such figures these days, when all elements of operation fluctuate from period to period to a much greater degree than heretofore. Comparing current results with those of prior periods may be historical analysis, but it isn't cost control.

One reason why more refrigeration servicemen and dealers don't budget is that they tried it once and got nowhere. Their estimates were way off. This may happen at the start. Stick to your knitting and you'll find that your estimates make a better grade.

Businessmen in general have a knack of sizing up coming events that influence their operations, but too many lack a methodical plan for anticipating these changes. Bud-

getary preparation is wholesome from a business standpoint because it sharpens your vision, and compels you to watch, anticipate, analyze and determine trends. It begets sound thinking about your business and the factors that influence it; it gives you a long-term objective instead of a day-to-day perspective. A planned routine is better than hit-or-miss operation at any time.

In general, budgets are based on experience figures and estimates of future business possibilities in terms of sales, cost of labor and materials, margin, overhead, net profit and spendable profit after the tax is deducted. Experience figures are used

Continued on page 36



Cylinders Come Clean

Refrigerants Can't Be Cleaner Than The Cylinders In Which They're Kept. Here's A Way to Put—and Keep—Your Service Drums in Tip-Top Shape.

IT is just as important to use a clean service cylinder as to have available satisfactory refrigerants—for the refrigerant can be, and oftentimes is, contaminated by transferring to a dirty service cylinder. It is therefore necessary to keep all service cylinders used for charging exclusively for this purpose. They should be stenciled or otherwise marked or painted.

Cylinders that are used to receive refrigerant from machines should be employed only for this purpose. They should be marked in some distinctive fashion, preferably painted a different color, and stenciled to indicate use.

While a charging cylinder can be used to remove refrigerant from a machine, it should not, until thoroughly cleaned, be used again for pure refrigerant. Such exchange is undesirable, since it results in mixing cylinders used for charging with those used to receive refrigerant from machines.

Checking for Dirt

To determine whether a cylinder is dirty or clean, the following simple procedure may be used:

Evacuate the cylinder and introduce into it just enough methyl chloride or "Freon 12" (usually 3-4 oz. will suffice for a service cylinder) to leave liquid refrigerant in the cylinder, which acts as a wash. (Note: Do not use other wash materials such as carbon tetrachloride, since they may introduce moisture and are difficult to remove from the cylinder.)

Shake the cylinder vigorously for a few minutes, to dissolve and/or sus-

By Dr. Walter O. Walker
Ansul Chemical Co.

pend any oil, sludge or solids. Invert the cylinder, and drain the liquid into a clean glass or metal container. The refrigerant will evaporate within a few minutes. If a residue of oil, sludge or solids remains after evaporation, the cylinder must be cleaned before being used for charging.

A residue of water remaining after evaporation is no evidence that the cylinder contained moisture, since evaporation of refrigerant in contact with moist air always results in the condensation of water. If the service cylinder has been properly cleaned, and this test fails to show the presence of oil or other contaminants, it may normally be assumed that moisture is absent.

However, a cylinder from which the air has been evacuated, may, when

opened in moist air, receive some moisture with the entering air. How much moisture enters will depend on the amount present in the air and the quantity of air introduced.

Subsequent evacuation of this cylinder, prior to filling with refrigerant, will remove the major part of the moisture carried in with the air. To be certain it is advised that the oven treatment (see below) be resorted to.

Cleaning Cylinders

Cylinders are cleaned in plants producing refrigerants by subjecting them to routines involving specialized equipment and operations. At the same time, valves and fuse plugs are removed, inspected, and replaced where necessary. This insures clean, dry cylinders, with all parts functioning properly.

While this routine is too costly for use by service organizations in general, nevertheless it is possible to establish a procedure by means of which service, as well as larger cyl-

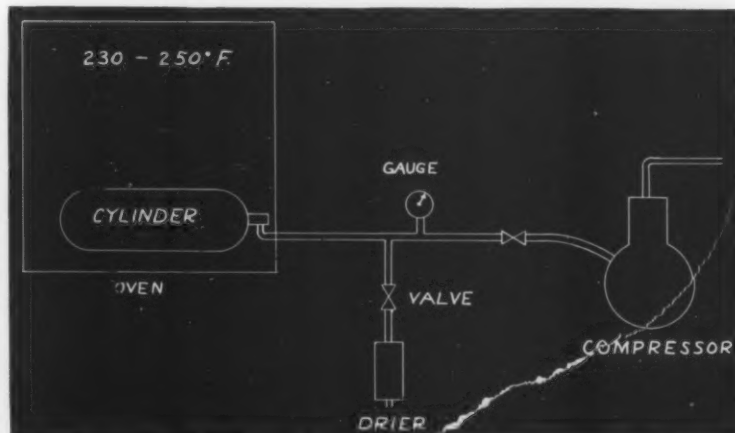


Figure 1: Illustrating the oven drying method of cleaning refrigerant cylinders.

Figure 3: Drying cylinder assembly, using both a cooler and a steam preheater unit.

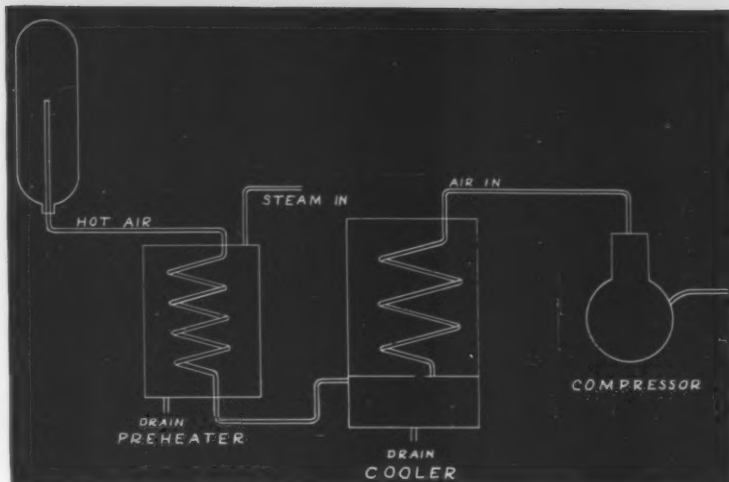
inders, may be cleaned and dried.

The procedure presented below is by no means the only one available, and it therefore represents but one way of cleaning, drying and servicing cylinders. For routine treatment of cylinders the procedure is followed in full, although where washing with a little of the refrigerant (see above) has indicated the absence of foreign substances in the cylinder, drying may be accomplished as follows (see Figure 1):

1. If the cylinder is equipped with a fuse plug, replace with solid steel or brass plug.

2. Connect the valve of the cylinder to a $\frac{1}{4}$ -inch copper tube, which in turn is attached to the suction side of a compressor. [Do not use a water vacuum pump.] A vacuum gauge and a tee connection should be inserted in the copper tube close to the compressor. If several cylinders are to be dried at the same time, a manifold may be used.

3. Put the cylinder in an oven (230-250°F) and evacuate it to the lowest obtainable vacuum for 2-3 hours, breaking the vacuum each half hour with dry air. Dry air may be obtained, where the requirement is small, by connecting an ordinary drier, filled with any suitable drying agent, to the tee-connection. The cylinder may be judged to be dry when, after closing the valve to the suction side of the compressor, the vacuum gauge fails to show any increased pressure in one half hour due to evaporation of water. All fittings must be tight, or air



leakage will produce a pressure rise. Cool the cylinder to 150°F., and insert the fuse plug. Use glycerol-litharge or other suitable luting compound. If the cylinder is not filled at once, evacuate and run in just enough refrigerant to give a positive pressure.

When the "refrigerant wash test" shows the presence of foreign material, or when scale and/or metallic objects are noted on shaking the cylinder, the following procedure is advocated:

1. Remove the valve and fuse plug (if one is present), flush out residual gas with air (good ventilation), and shake or pour out all foreign material possible.

2. Examine the interior of the cylinder with a small drop light (a 6-volt transformer connected to 100 A.C. circuit and using a flash light socket and bulb), or an ordinary flash light.

Removing Scale

3. If scale is present, it may be removed by placing $\frac{1}{4}$ -inch ball bearings and soap solution in the cylinder, plugging the openings with corks or plugs, and then rolling or shaking the cylinder for about five minutes. Tapping the cylinder will help loosen the scale. Invert the cylinder, remove the plugs, and drain the contents into a pail. Rinse the cylinder with tap water, using a short section of tube or hose. One and one half pints of soap solution (one ounce of soap powder to three quarts of water) and 6 lbs. of ball bearings are recommended for a 6-lb methyl chloride cylinder. Other

sizes of cylinders require proportionate quantities.

4. Inspect with a light, and if scale still remains, repeat operation No. 3.

5. If scale is absent or has been removed, place the cylinder on a rack, insert a steam line (copper or iron pipe), and pass steam through until the cylinder is hot (see Figure 2). This will require about five minutes if high pressure steam is used, longer if less pressure is available.

Drying Cylinder Assembly

6. Remove the steam line, and insert another line furnishing a hot, dry air blast (see Figure 3). Hot dry air under pressure may be furnished by using a compressor, a cooler to separate out moisture, and a steam preheater, in the order named. The cooler is sometimes omitted, but the drying period for the cylinder should be lengthened to compensate. The preheater should be of sufficient capacity to heat the air nearly to steam temperature. Six to eight minutes' treatment generally removes all the moisture.

7. Inspect the cylinder with a light, to be certain it is dry, and insert the fuse plug (if the cylinder is equipped with one) as soon as the cylinder cools below 150°F. Replace the valve, using glycerol-litharge or other suitable luting compound. Evacuate the cylinder while warm, and, to be certain all moisture is absent, treat the cylinder according to the oven method outlined above.

8. Evacuate the cylinder, and if filling is not carried out soon, add enough refrigerant to give a positive pressure in the cylinder.



Figure 2: Showing the method of inserting steam line in a refrigerant cylinder.

Shop Layout

for EFFICIENT

IN LAST month's Shop Layout article, emphasis was placed on the desirability of supply mechanics in the shop with clean assemblies with which to work. Figure 1 illustrates the hot alkali tank and the fresh water rinse tank in which this cleaning operation is performed. To the right of the cleaning tank is a gas-fired dehydrating oven, with a vacuum pump located above. A swinging chain hoist is located over the two tanks, so that heavy items (such as condensing units less motor, cast iron condenser bases, etc.) can be handled with ease, and without danger of scalding the operator with these hot solutions.

In addition to the two tanks illustrated, a third tank with circulating pump, using petroleum spirits as a solvent, should also be a part of the modern service shop's equipment. Many items, such as electric motors and aluminum parts, which would be damaged in a hot alkali solution, can be cleaned safely with petroleum spirits.

All items repaired in the shop should be properly protected with a good grade of paint, properly applied, when the overhauling and testing operating has been completed. This operation not only increases eye-appeal to the customer, but protects the machinery from rust and corrosion when it is installed in the field.

Spray Booth

Modern spray booths should employ an exhaust fan of sufficient capacity to carry off fumes at a rate fast enough so that they will not be objectionable to the operator. There are two types of booths, one consisting of three walls and a ceiling with an open front, and the other a totally-enclosed booth. Figure 2 illustrates the latter type. However, the doors do not show up in the illustration. In each of the two doors are fitted three 20 x 25-inch air filters, provided to filter approximately 6,000 cubic feet of air per minute. This type of installation with air filters permits

spraying of refrigerator boxes when considerable dust is present in the shop. This has always been a hazard in a refrigerator repair shop. About the time a refrigerator has been sprayed, someone uses the air hose to clean a dirty condenser, and not only must the paint job be done over, but the old paint and dust must first be removed. The alkali tank is used in connection with this booth for removing paint from panels, by completely immersing them in this hot solution.

Charging Equipment

Refrigerant charging equipment should be located adjacent to the spray booth, so that the exhaust fan can be used to carry off refrigerant odors when charging service cylinders. Care must be taken, however, to remove freshly painted items from the spray booth before it is used in conjunction with the charging equipment. A number of methods may be used to transfer refrigerants to service cylinders. However, the most acceptable—and least hazardous—method is to use a chilling device between the large drum and the service cylinder. In transferring refrigerant after it has been chilled, it is possible to condense moisture on the charging lines and service drum. Extreme care must be taken to see that none of this moisture can gain entrance to the charging equipment or service cylinders.

Adjacent to the charging equipment should be a tool board and some bench space, so that all tools necessary to the charging operation can be within arm's length of the operator. In addition to the standard wrenches used in charging of service

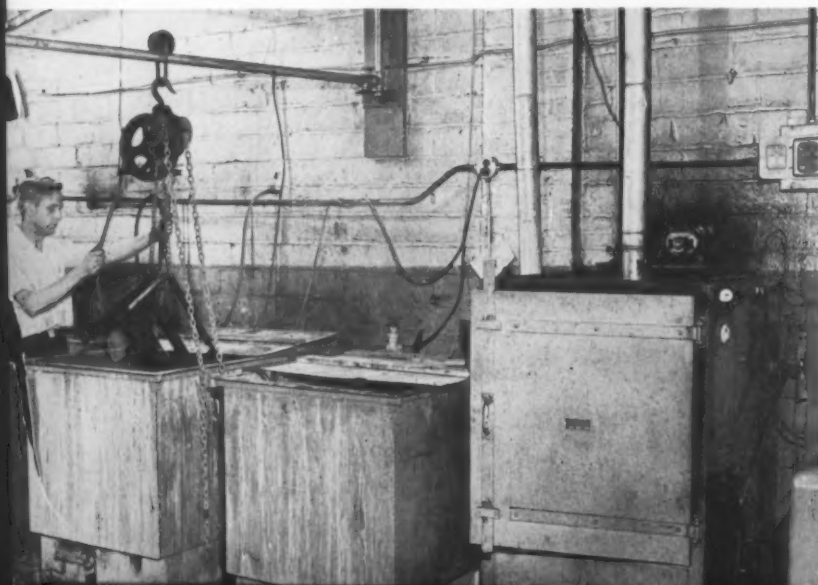


Figure 1: Hot alkali tank and fresh water rinse tank for parts cleaning operations.

**Here's the "Model Arrangement"
for Cleaning, Painting, Refrigerant
Charging, and Motor Repair Sections
of the Modern Refrigeration Shop.**

SERVICING WORK

cylinders, there should be provisions for testing cylinder valves, a method of cleaning service cylinders, (described in detail in the article beginning on page 18 of this issue), and a reseating and thread-dressing tool for flare connections to drums.

A few power tools are a "must" in a well-equipped refrigeration shop. Those usually found are a drill press, portable electric drill, electric sander, a power wood saw for use in crating shipments, and an emery wheel for keeping hand tools in condition. A flexible shaft and buffing wheel also is desirable, for cleaning metal parts. Care should be taken to locate these tools so that they are convenient to the greatest number of operators, without their having to travel a very great distance.

Motor Repair

During this period, motor repairing is essential to fast service, and can be profitable to the operator of a refrigeration repair shop. In most cases, it is not practical to rewind motors. However, 85 per cent of all motor repairs fall into the category commonly termed "minor motor repairs," which consists of replacement of bearings, brushes, turning the commutator, and installing new leads, on the repulsion-induction type motor, and installing capacitors, starting switches, and bearings, on the capacitor-start motors. Comparatively few tools are necessary for this work; however, motor repairing should not be attempted without the following equipment:

- Arbor press.
- Vise.
- Watt-meter.
- Ammeter.
- Growler.
- Commutator under-cutter device.

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Figure 2: Totally-enclosed type of paint spray booth.

Figure 3: Motor repair bench, showing general layout.

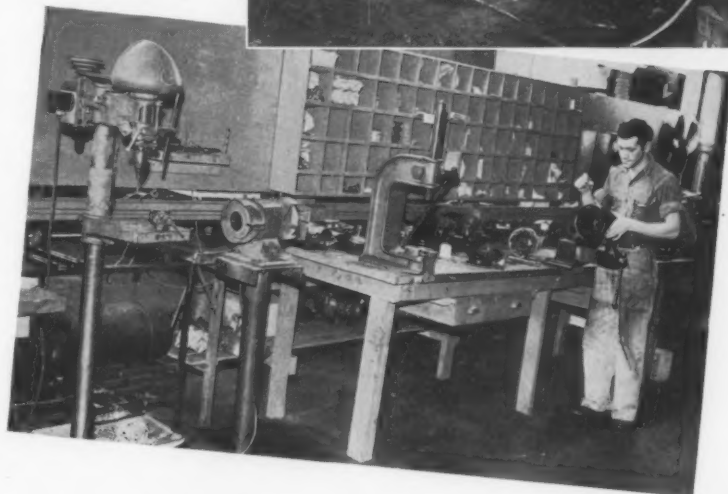
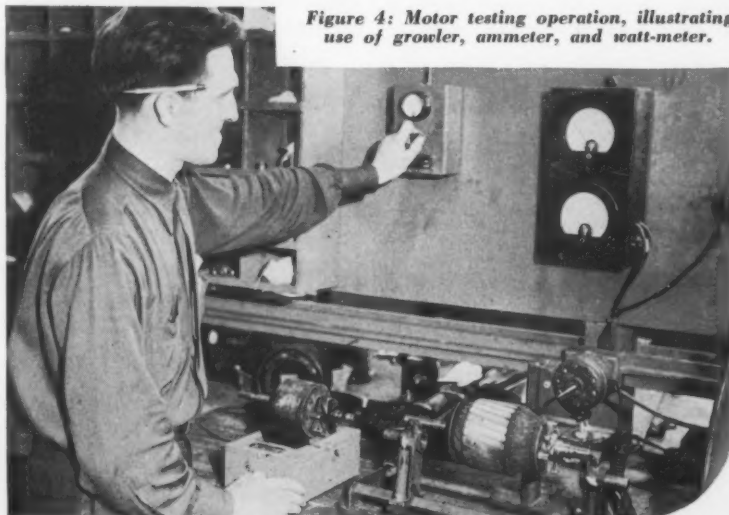


Figure 4: Motor testing operation, illustrating use of growler, ammeter, and watt-meter.



For Better Welding Beads

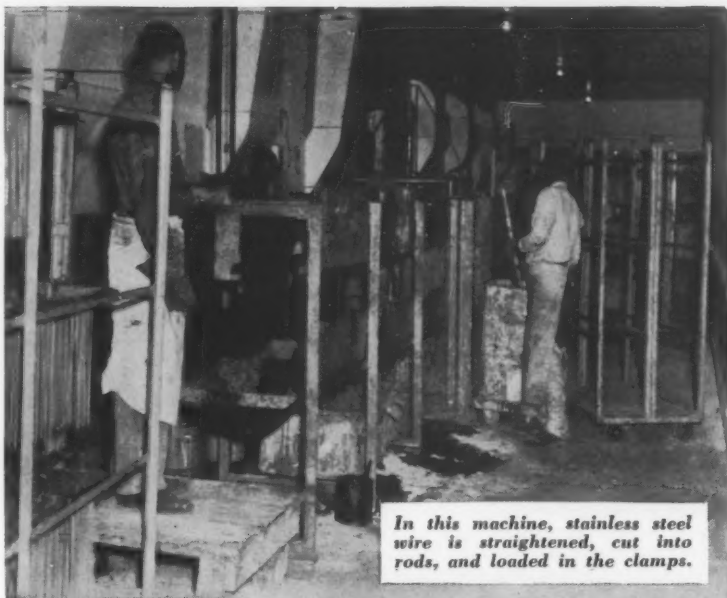
Conditioned Air Makes a Quality Product.

MAKING arc welding electrodes has become a major league operation. These electrodes are simply pieces of wire on which is dipped or extruded a coating which keeps the atmosphere away from the welding arc during the process of welding (and in some cases adds alloying elements to the weld "bead").

The original "covered" electrodes, made of mild steel with silicate of soda base material, were comparatively simple. As the years have gone by and the process has grown, the necessity for uniformity and the further problem of increasing the alloying range in the welding process have led to many refinements in electrodes. Conditioned air has become an important factor in mass production of this important product. This is particularly true in the manufacture of stainless steel electrodes where the original material is of comparatively high cost and the quantity and quality must be controlled closely, to reduce rejects. One of the plants producing stainless steel electrodes is that of the Arcos Corporation, Philadelphia, Pa. Uniformity of air velocity and constant humidity conditions are controlled through air conditioning.

Stiff stainless steel wire is delivered in coils and first goes through a straightening and cutting machine which delivers rods 14 and 18 inches long. These rods are loaded in clamps and are dipped into a paste in such a manner as to have the coating uniform on all of the rods. Concentricity of coating is a very important factor in this manufacturing process because very small variations may influence the welding operation.

The freshly dipped rods are loaded on a truck and wheeled into a drying tunnel. This sequence of dipping and a two-stage drying is repeated four times. During the first three cycles the electrodes remain in the tunnel between one and two hours at a temperature of 76 degrees, with 58 per cent humidity. Air conditioning equipment obviously is necessary to obtain the low dew point air needed.



In this machine, stainless steel wire is straightened, cut into rods, and loaded in the clamps.

Rolling loaded trucks into drying tunnel.



Readying freshly-coated rods for the drying operation.

DAVISON'S
SILICA GEL SETS
THE STANDARD FOR
DRYING AGENT
PERFORMANCE
No. 4



PROCESSED
ESPECIALLY FOR
THE DEHYDRATION
OF
REFRIGERANTS

ITS
*Maximum
Capacity*
**FOR MOISTURE
IS
UNAFFECTED BY OIL**

Because a large proportion of troubles and service difficulties are due to the presence of moisture in the system, it follows that complete removal of moisture will eliminate . . . freeze-ups, corrosion, oil deterioration, copper plating and oil sludging.

You will find that Davison's Silica Gel has $1\frac{1}{2}$ to 2 times as much capacity as other types of drying agents . . . gives you more value per pound in time saved on the job and in reduction of "make-good" service calls.

In addition—Davison's Silica Gel removes acids that cause corrosion; it acts instantly; it will not attack metals or alloys; it will not cake nor powder. Effective on Freon, Methyl Chloride, Sulphur Dioxide, etc.

Your regular jobber stocks Davison's Silica Gel—in factory-charged dehydrators and for refilling.

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10,000,000

SUPPLYING the food requirements of the hundreds of thousands of Federal workers in wartime Washington has brought problems aplenty to the Cafeteria Division of the Welfare and Recreation Association of Public Grounds and Buildings, which serves the astounding total of 70 million meals a year through units located in about 60 government buildings.

Refrigeration is only one of these problems—but it's a mighty important one. For, at the present time, the Association is serving more than 28,300 tons of food a year—and the bulk of this food requires controlled temperatures from the time it leaves the farm, packing house, wharf, or warehouse until it appears on a cafeteria counter.

Filling the food requirements of Washington's wartime workers means big business in refrigeration, too. Here are some of the problems that go along with the job.

At the present time, the Association utilizes approximately 400 tons of refrigerating equipment to provide for the safe-keeping of 1050 tons of frozen foods, vegetables, and fruits, 900 tons of fresh meat, eggs, poultry, seafood, etc., and production requirements within the units themselves.

Most of this growth has come within the last four years—or with the advent of World War II. The follow-

ing comparison of the Welfare and Recreation Association's volume in 1944 and 1940 tells the story:

Persons served: 1944—70,000,000; 1940—10,250,000.

Employees: 1944—3,400; 1940—1,200.

Value of equipment: 1944—\$925,000; 1940—\$400,000.

Amount of food served: 1944—28,353 tons, cost, \$9,100,000; 1940—4,267 tons, cost, \$1,140,000.

Units operated: 1944—60; 1940—33.

Growth of the cafeteria organization has been so rapid that, up to last year, no centralized facilities existed for the storage, processing, and distribution of the huge quantities of food stuffs required. In normal times, this situation would perhaps not have been too troublesome; with the wartime uncertainties as to both food supply and transportation facilities, however, centralized facilities had to be provided.

Checking in a carload of carrots. The Association has produce space for a car and a half, needs space for seven cars.





400 TONS

Last November, the Association opened its own meat and dairy products commissary, providing both sub-zero refrigeration as well as space for the production and preparation of fresh meat. A vegetable commissary, established at the same time, gave the organization at least part of the space required to handle food storage for immediate needs. In addition to these local facilities, the Association rents warehouse space in various sections of the country for "interim" storage of meats, fish, fruits, and vegetables.

The meat and dairy products commissary occupies two floors of space for both processing of fresh meat and freezing of surplus—when there is



Noon-day lineup in the Social Security Building cafeteria.

any—for future use. The unit uses 50 tons of ammonia equipment, with refrigeration piped from a central source.

Fresh meat and poultry goes first to the processing room on the first floor of the structure, where a corps of 10 butchers, warmly dressed and wearing white gloves for protection against the cold, cut the steaks, chops,

roasts, etc. Temperatures in this room are held between 35 and 40° F.

Volume of meat products processed varies all the way from 12,000 to 20,000 lbs. per day. All together, the 60 cafeterias use from 20,000 to 32,000 lbs. of meat a day, getting the difference between requirements and what it processes directly from the

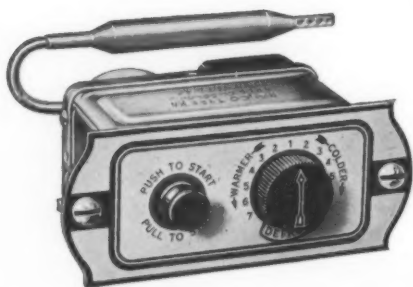
Continued on page 47



Brine circulating coils provide refrigeration in the meat processing commissary.



SILLY picture, isn't it? But perhaps it gives you some idea of the pride and confidence servicemen should feel when they install Ranco Replacement Controls. It is because the beautifully designed stainless steel cases, top frames and side covers place them in a quality class all their own. In addition, they are alert, precise, sturdy instruments that can be relied on to perform dependably. You can be proud and confident when you install Ranco Controls.



Ask your jobber about the exact replacement Rancostats, such as the one illustrated here, about the commercial and domestic controls.

WORK WITH YOUR JOBBER

The production of Ranco Controls is limited. If the type you desire is not available, your jobber will recommend one that is easily adaptable.

Ranco Inc.

COLUMBUS 1, OHIO



THE SERVICE MAN'S DEPARTMENT

Competition. We get some swell letters from our readers, also some very stimulating ideas; for instance, in a letter of recent date which included a lot of interesting sales material, one of the most vital things the writer had to say was about competition—and inasmuch as we all must consider competition, especially in our post-war world, it might be a good idea to pass along some of these observations.

One of the most common human failings generally is the tendency to assume a superior attitude toward competition. Because of that fact, more businesses die from dry rot than go broke from selling merchandise too cheap. It is much healthier to overestimate the business that is being done by our competitors than to underestimate their volume. It is far too human and natural and easy to feel that the other guy isn't as smart or as good as we are, but the long list of "irreplaceable" men who have been replaced is proof that self-content is a dangerous thing. The man, or business, who settles down with the conviction that he and his stuff is best is riding for a tough fall.

In our day we've sold a lot of things; and the things we had the hardest time selling were the things we were certain were unbeatable values. The ones we assumed would sell themselves never did. It's a queer time to be talking about high-powered selling, seeing that we're in a buyer's market. But again, that assumption that what we have for sale is automatically going to go like hot cakes is a dangerous mental state. Let us steel ourselves for the post-war world by being terribly realistic about selling. Let's not snicker at our competitors. Post-war selling is going to be SELLING, not just taking

This section of
The Refrigeration Industry
is edited by
Warren W. Farr
Refrigeration Maintenance
Corporation, Cleveland, Ohio

orders, the way our friends the butchers are now doing.

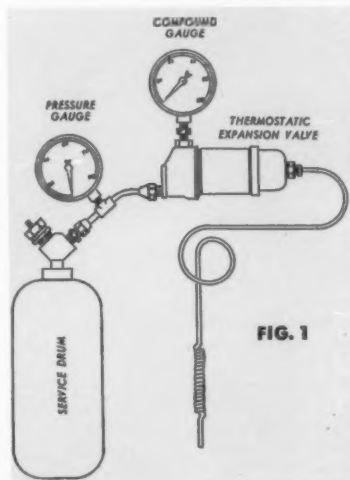
Service Tip. Often on old jobs, particularly sulphur dioxide, the liquid line shutoff valve will become plugged with carbon or foreign matter. Good procedure would require removing the condensing unit to the shop and thoroughly cleaning and overhauling the entire system; however, under present conditions, it might be desirable to make a temporary repair, so that complete overhauling can be done during the winter months.

Two methods to accomplish this can be used. The first method would be to pump down and disconnect the liquid line and connect the liquid line shutoff valve to the gauge port of the discharge shutoff valve. After this connection is made, attach a drum of refrigerant to the suction side of the compressor, and front-seat the discharge and suction valves. Then start the compressor, which will reverse the refrigerant flow through the liquid line shutoff valve, and dislodge the dirt and carbon collected there. Care should be taken not to exceed 200 lbs. pressure in the by-pass line.

The other method would be to heat a service drum charged with the same refrigerant as contained in the condensing unit, and after removing the liquid line from the liquid line shutoff valve connect the service cylinder. The pressure difference between the

service cylinder and the condenser will cause a reversed flow of refrigerant through the condenser shutoff valve, and dislodge any foreign material. The particles of dirt and carbon washed out of the liquid line valve will usually settle in the bottom of the receiver, and permit the job to operate satisfactorily for a short period of time.

Thermostatic Expansion Valve Tester. Many thermostatic expansion valves sent back to the factory for repair are only out of adjustment. Figure I below illustrates a simple test method using refrigerant to test and adjust an expansion valve. Figure II shows how expansion valves can be checked by using air instead of refrigerant. To test a thermostatic expansion valve in the field all that



is needed is a pressure of 60 lbs. or more. This can be obtained from an air line or from a drum of refrigerant at room temperature, which will develop a pressure of 60 lbs. or more. Next we must have a 32° bath which

can be maintained in a thermos bottle filled with cracked ice and water, in which we immerse the thermal bulb of the expansion valve. Pressure gauge and compound gauge should be installed as indicated in Figure I.

Test Using Refrigerant

To make the test, open the valve at pressure source and loosen the compound gauge in the expansion valve outlet, so that a small amount of pressure can escape. Compound gauge should now indicate a pressure equal to the boiling point of the refrigerant at 22°, which equals the temperature of ice at 32°, minus the 10° superheat. If the expansion valve is a Freon valve, compound gauge should read 22 lbs.; for methyl chloride 15 lbs., and for sulphur dioxide 4 lbs. Note that these pressures are true only if the superheat adjustment is 10°. If the compound gauge does not indicate these pressures, the valve is out of adjustment, and should

be adjusted by turning the superheat adjusting mechanism until the desired pressures result.

To check for a leaky valve, screw up the compound gauge to stop the leakage at the valve outlet. If the needle and seat assembly are not

tee, and screw the gauge to be calibrated at the second tee. Open valve A and close valve B. When gauges correspond, the second gauge is calibrated.

To test vacuum or compound gauges, proceed as in the test for pressure

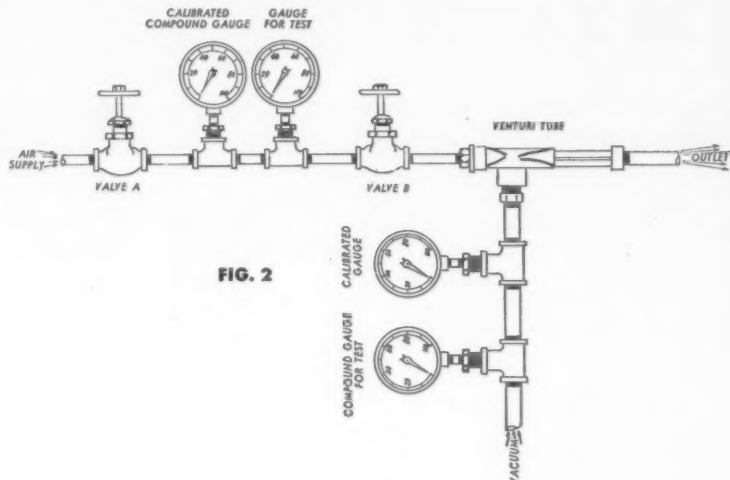


FIG. 2

I do it
this way...

In changing expansion valves and other accessories on the low side of a system (especially on low temperature jobs) install gauge at compressor service valve and make connection to gas drum. Pump down system in usual manner, then open service valve on gas drum, allowing 2 to 5 lbs. pressure to build up in system. Remove expansion valve, allowing gas to escape from drum at small pressure, to blow out moisture and prevent air entering system. On small systems only a fraction of a pound of refrigerant is required; on large systems, 1 or 2 lbs., unless coils are very cold. On sulphur dioxide systems, nitrogen may be used to build up desired pressure.

W. Hall Moss, Memphis, Tenn.

leaking, the pressure will increase a few pounds, and then stop or build up extremely slowly. With a leaking valve, the pressure will build up rapidly until it equals the inlet pressure. To check the power element for a loss of charge, loosen the compound gauge again to permit a small leakage through the threads at the outlet, and remove the feeler bulb from the cracked ice and water. As the feeler bulb warms up, the gas pressure at the compound gauge should increase rapidly. If the pressure does not build up, it is an indication that the power element has lost its charge, or that the valve has a maximum pressure operating feature, which usually will be indicated on the body of the valve.

Test Using Air

If it is not desirable to use refrigerant in making this test, air can be used in connection with the device illustrated in Figure II. The entire device illustrated in Figure I, less the service drum, should be attached at the second (marked "gauge for test") in Figure II. Turn on the air supply, open valve A and close valve B, and proceed as in the test previously described. Figure II can also be used to test pressure and compound gauges. Have a calibrated gauge at the first

gauges. Screw gauge to be tested at tee marked "compound gauge for test." Open both valve A and valve B. When gauges correspond, the second gauge is calibrated. Venturi tube can be made from a half or three-quarter inch tee. Openings can be adjusted as to size and distance from each other in order to obtain the best vacuum.

Heat Exchangers. There has been considerable discussion concerning the location of heat exchangers when applied to temperatures above freezing, and temperatures below freezing. Some heat exchangers have been installed in the refrigerated area and others have been installed in the space adjacent to the refrigerated enclosure. In most cases, it is desirable to imbed the heat exchanger in the insulation of the refrigerated enclosure. In so locating the heat exchanger no heat can be radiated to the refrigerated space, nor can the heat in the room outside the space enter the heat exchanger or deposit moisture on the surface of the heat exchanger. If the heat exchanger is located in the room adjacent to the refrigerated fixture, the liquid line leaving, the suction line entering, and the heat exchanger itself should be insulated.

BONNEY

Miniature Wrenches

For Little Nuts in Tight Places



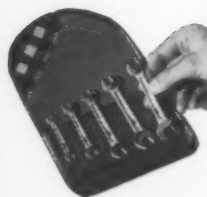
Here's how to speed up your work on carburetors, distributors, radios and anywhere else that little nuts in tight places are often such a headache. Use Bonney Miniature Wrenches and see the difference they make—the time they save you!

Bonney Miniature Wrenches are small but tough, with accurately machined jaws that fit the nut *just right*. There's no binding, no slipping with Bonney Miniatures. To help you get into close 'quarters' easily, they have specially-designed pear-shaped heads that take up minimum space, yet actually give

you greater turning room. And to provide sure leverage and longer wrench life, the points of greatest strain are reinforced with extra metal and carefully balanced with the rest of the tool.

Bonney Miniature Wrenches are made of the same high quality tool steels, to the same exacting specifications, as all of the tools in the famous Bonney line. We spare no cost to assure a top quality product for you...

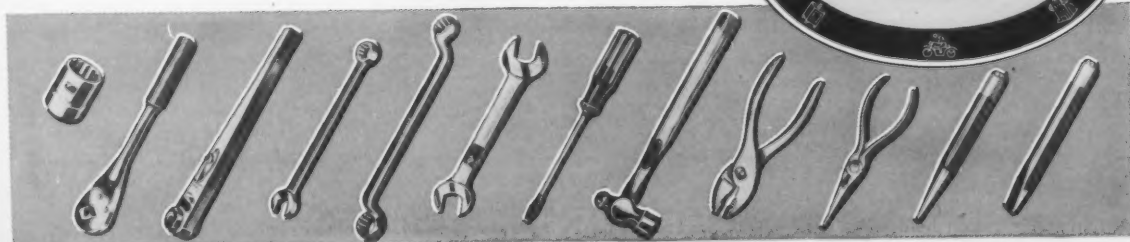
Bonney Tools are sold exclusively through jobbers from coast to coast.



Wrench No.	Openings Milled	Length	Thickness Heads
H10	$\frac{3}{16}$ & $\frac{7}{32}$	$2\frac{1}{2}$ "	$\frac{3}{32}$ "
H12	$\frac{1}{4}$ & $\frac{9}{32}$	$3\frac{1}{4}$ "	$\frac{5}{32}$ "
H14	$\frac{5}{16}$ & $\frac{11}{32}$	$3\frac{3}{4}$ "	$\frac{3}{16}$ "
H16	$\frac{3}{8}$ & $\frac{7}{16}$	$4\frac{1}{8}$ "	$\frac{7}{32}$ "
H18	$\frac{13}{32}$ & $\frac{15}{32}$	$4\frac{1}{8}$ "	$\frac{7}{32}$ "



BONNEY FORGE & TOOL WORKS • 719 N. MEADOW ST. • ALLENTOWN, PA.





STERLING F. SMITH

Sterling F. Smith, chief of the Refrigeration and Air Conditioning Section of the General Industrial Equipment Division, War Production Board, has resigned effective August 1. After a short vacation, he will assume management of the commer-



S. F. SMITH

cial refrigeration division of Mills Industries, Inc., Chicago.

Mr. Smith has been in the War Production Board since September, 1941. Since then he has administered regulations covering production and distribution of refrigeration and air conditioning equipment, rules covering distribution of "Freon", and regulations covering administration of all refrigeration equipment.

Charles M. Stewart, who has been deputy chief of the Special Equipment Branch of the General Industrial Equipment Division, will replace Mr. Smith. Before joining WPB, Mr. Smith was with Nash-Kelvinator Corp. in New York.

JOHN L. MAHONEY

John L. Mahoney, formerly General Electric distributor in northern New Jersey, has joined the staff of Carrier Corp., in connection with the company's intensified work in the applied refrigeration field.

L. C. TRUESDELL

Leonard C. Truesdell has been appointed assistant commercial manager of the manufacturing division of Crosley Corp. A veteran of 20 years in merchandising, Mr. Truesdell comes to Crosley after 10 years with Frigidaire.

A. E. NAFE and HENRY W. UHL

A. E. Nafe and Henry W. Uhl have been named regional managers for Airtemp Division of Chrysler Corp. Mr. Nafe will be in charge of sales and service in the Philadelphia area; Mr. Uhl will cover the Chicago area.

LEE STRATTON

Lee Stratton has been appointed manager of refrigeration for the manufacturing division of Crosley Corp., Cincinnati.

W. A. SIEGFRIED

W. A. (Wid) Siegfried has joined Superior Valve and Fittings Co. as assistant to K. M. Newcum, vice president in charge of sales. The majority of Mr. Siegfried's 10 years in the



W. A. SIEGFRIED

industry was spent in the eastern district. He had headquarters in Atlanta during 1937, traveling the southeastern states. In his new capacity, Mr. Siegfried will be stationed at the factory in Pittsburgh.

OTTO Z. KLOPSCH

Otto Z. Klopsch has resigned as vice-president and director of Calumet & Hecla Consolidated Copper Co. and general manager of the Wolverine Tube Division.

M. Y. Bassett has been named acting manager of the Wolverine Tube Division.

R. A. KLOKNER

Randolph A. Klokner has been appointed Chicago district manager for Vilter Mfg. Co., Milwaukee. He for-



R. A. KLOKNER

merly was sales engineer in charge of the Milwaukee and Wisconsin for 17 years. In his new position, he will direct the company's sales and construction activities in the Chicago area.

F. E. JERNBERG

F. E. (Jerry) Jernberg has resigned from his position as manager of the commercial refrigeration division of Mills Industries, Chicago. He has recently acquired an interest in the Minneapolis Showcase and Fixture Co., and is leaving to take an active part in the management of this company.

C. E. LEWIS

Carroll E Lewis has joined Perfex Corp., Milwaukee, as vice president and manager of the controls division. Previously he had been with the Delco Appliance Division of General Motors, where he was general sales manager for the past five years. Mr. Lewis' industry experience also has included service with Frigidaire and Delco-Frigidaire divisions of G-M.

D. K. TRESSLER

Donald K. Tressler, manager of General Electric Consumer Institute and well known in the refrigeration and food industries, has been named an honorary member of the Food and Nutrition Society of Brazil. At the present time he is directing frozen food research for General Electric.

LESTER T. AVERY

Lester T. Avery, president of Avery Engineering Co., air conditioning and refrigeration engineering firm, has been elected to the Board of Trustees of Cleveland Engineering Society.

HAROLD F. CARR

Harold F. Carr has resigned as chief of the Electrical and Mechanical Repair Section, Service Trades Division, Office of Civilian Requirements, to return to his position as superintendent of electric appliance service and merchandising for Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

WILLIAM A. HAILE

Preparing for expanded post-war markets overseas, Carrier Corp. has appointed William A. Haile as manager of its International Division's Washington, D. C. office, and has named Colin McCulloch as market research manager of that division.

SYRACUSE JOBBER MOVES

Central Service Supply Co. has moved its Syracuse, N. Y. operation into a new and larger building at 516-20 Erie Blvd., E. The new location will furnish about 3800 sq. ft. of floor space with 55 feet of frontage on Erie Blvd., one of the city's busiest downtown streets. Changes in the new location will include a 40-foot customer counter as part of the plan of display.

OPENS IN PHILADELPHIA

Frank M. Eversden, head of F. M. Eversden & Associates, has opened offices at 220 S. 16th St., Philadelphia, from which he will cover Pennsylvania, New Jersey, Delaware, Maryland, and the District of Columbia as manufacturers' agent for Penn Brass & Copper Co., McIntire Connector Co., Electromatic division of the Simoniz Co., and Polar Refrigeration Hardware Co.

Give me a 5-letter word
meaning dry SULFUR
DIOXIDE and METHYL
CHLORIDE



ANSUL*



Available in carload lots or handy cylinders sized for servicemen's needs.

ORDERS FILLED PROMPTLY
through your Ansul Jobber.

ANSUL CHEMICAL COMPANY
MARINETTE, WISCONSIN

Agents for Kinetics "FREON-12" and "FREON-22"

*REG. U. S. PAT. OFF.

RI-3-44A

SHOP LAYOUT . . .

Continued from page 21

Bench lathe.
Soldering iron.
Wire scrapers.
Necessary hand tools.

Figures 3, 4 and 5 illustrate the layout and placement of motor reconditioning equipment. Here again, the location of parts bins is above the motor repair bench, within arm's length of the operator. Small parts are kept in glass containers, with part numbers plainly marked on the outside. All bins also carry parts numbers, to facilitate the operator in re-ordering when his supply diminishes. Under the bench are three convenient drawers, where the operator can place his small tools.

It is desirable, in the motor operation, to separate the tear-down and assembly operation from final testing and the lathe operation, as the lathe operation in a shop has many uses in addition to being one of the most important tools for motor repairing. If the lathe is located at the extreme end of the bench, other operators can use it without interfering with the

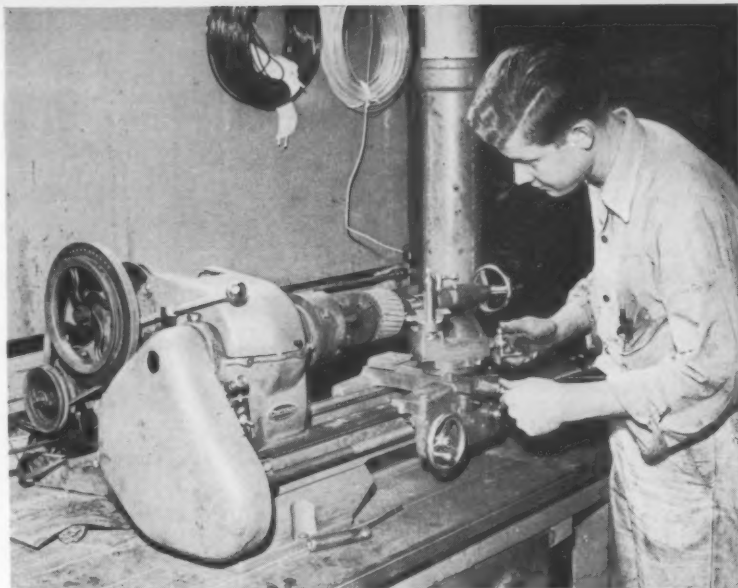


Figure 5: The lathe is used extensively in modern motor repair work.

production of the motor department.

The motor testing operation should be located where other sounds do not interfere. One of the important functions of testing an electric motor is to determine that the operating sound

level is not excessive. Shelf space should be provided to the shipping counter for all completed work, and as soon as a job has received the final inspection and finish painting, the work should be immediately costed and placed on this shelf, out of the way of the operator and ready for delivery to the customer.

A definite day each week should be set aside to inventory and thoroughly clean the shop, and also to provide time for making any repairs to shop equipment, cleaning of degreasing tanks, and the many other jobs that are apt to be neglected unless a regular routine is followed. All items not currently being repaired should be stored outside of the shop area, so that an orderly shop can be maintained. A clean shop is an indication to the customer of clean, efficient work—and, while he may not place too much emphasis on that particular phase of the operation today, he is almost sure to do so when the refrigeration servicing picture returns to something resembling normal.

LOCKER LOANS

Rural Electrification Administration has made allotments totaling \$73,500 to three cooperatives to provide locker storage facilities. The groups are Electric Cooperative Refrigerator Co., Inc., York, S. C.; Bowie Cass Refrigeration Cooperative, Douglasville, Tex.; and Collin County Cooperative, Wylie, Tex.

DOLE
Vacuum
COLD PLATES

Maximum Refrigeration Efficiency

for all
**REFRIGERATION
PURPOSES**

DOLE REFRIGERATING COMPANY
5910 N. Pulaski Road, Chicago 30, Illinois
N. Y. Branch, 55 West 42nd Street, New York City 18, N. Y.

"HEATED" COOL AIR PROTECTS INSTRUMENTS

Air conditioning which heats while it cools now protects sensitive radio equipment in American battle areas, and may point the way to a new type of controlled indoor weather in peacetime.

The system which blends both heat and cold, makes practical a constant and accurately balanced ratio of temperature and humidity. Used by both the Army and Navy, the small self-contained unit has helped solve the problem of high tropical humidity in shelters housing critical instruments.

By actually reheating the air slightly after it has been cooled sufficiently to remove all unwanted moisture, the equipment is able to maintain a constant humidity of 50 per cent in the conditioned space, although the surrounding climate may frequently reach the saturation point. It prevents temperatures from falling too low by putting back automatically into the conditioned space some of the heat units which it has taken from the air.

Air conditioning and humidity control are vital to many new types of high frequency radio equipment, not only to protect the sensitive apparatus itself but also to safeguard the men who operate it. The problem is complicated by the fact that in tropical regions engineers must contend with the intense heat created by their own equipment as well as with the weather outside.

The condenser reheat unit solves this problem by interrupting the normal cycle of a conventional air conditioning system. It taps off some of the hot refrigerant gases after they have left the compressor and are on their way to discharge their load of heat units through a condenser. Instead of flowing directly to the condenser, the hot gases are passed through another coil which heats the air as it leaves the cooling mechanism. Automatic controls regulate the whole operation, turning on and shutting off the reheating coil to maintain an absolutely fixed ratio of temperature and humidity in the conditioned space.

WAR USES STILL TAKING MOST SMALL MOTORS

Production programs for fractional horsepower motors are being met at present, but additional motors probably will not be available for civilian use in view of the large military

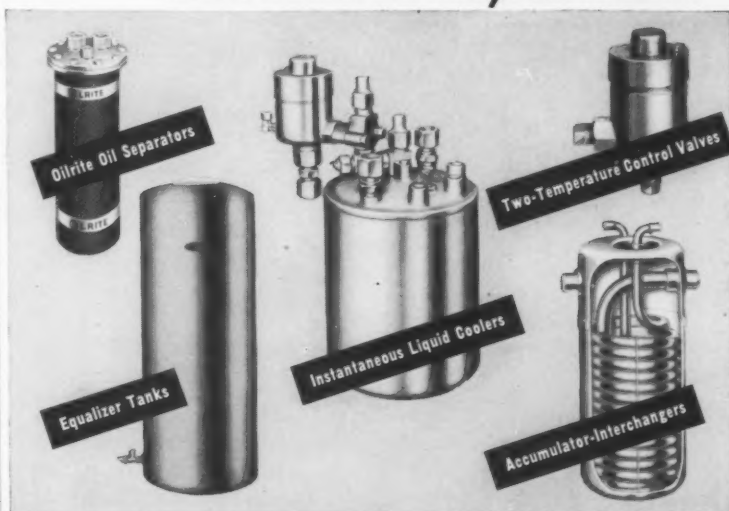
orders with which the industry is faced, the industry's advisory committee has reported to WPB.

The group recommended that the CMP allotment application procedure be simplified with respect to such critical common components, as electric motors. The committee's view is that since motor production is not actually limited by available materials supplies, the allotment application procedure serves no useful purpose. However, the group favors continuation of CMP reporting requirements and inventory restrictions

which apply to component manufacturers.

The supply situation with respect to standard A. C. fractional horsepower motors was discussed in detail. This type is the most critical of all types of fractional motors, and all manufacturers have large backlogs of orders. To remedy this situation, the committee recommended that use of the maintenance, repair and operating supplies (MRO) procedure for the purchase of such motors and products which require motors in their manufacture be limited.

AVAILABLE *right now!*



These TEMPRITE PRODUCTS for the replacement of defective equipment

DEALERS. Here's an opportunity for you to sell replacement equipment to those companies that are classified as essential

With increasing breakdowns of refrigeration equipment, industrial plants are now ready to buy new accessories for their existing equipment



ATTENTION, DEALERS

Automatic priority assistance is now available for replacement of defective equipment already installed. Write our sales department today for details.

Temprite's complete line of refrigeration accessories and their applications are:

INSTANTANEOUS LIQUID COOLERS—For cooling water, light oils, alcohol, brines, acids and caustics.

OILRITE OIL SEPARATORS—For keeping oil out of low-side evaporator coils, thereby improving operation and increasing system capacity.

TWO-TEMPERATURE VALVES—For maintaining constant temperatures on all types of evaporators.

ACCUMULATOR-INTERCHANGER—A liquid line, suction line heat exchanger used to increase capacity and to eliminate refrigerant slop-over. Especially valuable on low temperature applications.

TEMPRITE PRODUCTS CORP.

Originators of Instantaneous

41 PIQUETTE AVENUE



Liquid Cooling Devices

DETROIT, MICHIGAN



Refrigeration service men on emergency repair calls will get real "emergency service" if they need it in the District of Columbia this summer. Recognizing the necessity of keeping existing equipment in operation during the hot months, especially in hospitals and other

public institutions, District government officials have guaranteed to send police patrol cars or ambulances, if necessary, to get the service man to these jobs in a hurry if his own equipment is out on another call or breaks down while he is on his way to a "high-priority" job.

Postwar marketing of fractional horsepower electric motors was also discussed by the committee. Members pointed out that after the last war, many duplicate orders for fractional motors to be used for civilian purposes were placed, and then canceled at later dates. Commenting on the resultant harm to the fractional motor producers' industry, they recommended that steps be taken to as-

sure that a similar situation does not develop after the present war.

MRO RULES MADE CLEARER

WPB has clarified the use of the maintenance, repair and operating supplies (MRO) procedure for obtain minor capital equipment by issuing an amended interpretation (No. 11) to CMP Regulation 5 which provides that, while all labor costs

involved in making the material or equipment must be figured in the cost of such an addition, the labor used in constructing or installing the equipment does not have to be included.

This rule applies whether or not the installation work is done by a company's own employees or by an independent contractor who supplies his own labor. It also applies where the owner gets an independent contractor to furnish materials and labor for the job, and where the owner of the plant buys a machine and has the seller do the installation work.

The same general rules apply to determining the cost of materials needed for installation or relocation of equipment under Direction 15 to CMP-5, which permits materials costing \$500 or less to be used for relocating equipment which is already in a shop or plant.

Under CMP-5, a company can apply its own MRO rating to get materials and equipment for minor capital additions where the cost does not exceed \$500, excluding the purchaser's cost of labor.

2000 SERVICE MEN TRAINED AT FRIGIDAIRE WARTIME SCHOOLS

Marked by the training of 2000 men at 75 District Schools, plus an enrollment of some 5,000 dealers and servicemen in primary and post-graduate correspondence courses, Frigidaire 1943-1944 fall and winter wartime service Training Program has proved successful in the opinion of P. V. Sprout, service manager, who gives full credit for this contribution to the war effort on the refrigeration front to the cooperation and effort of the company's dealer organization.

In order to make certain that the fine record achieved during 1942 and 1943 would be continued, the company took steps to intensify and expand its service training operations to meet the ever increasing demand for qualified servicemen and to supply the need for essential repair and maintenance service.

"The problem we faced was all the more difficult in view of the diminishing manpower supply," says Mr. Sprout, "and the fact that the millions of Frigidaire installations in daily use were all a year older."

During the recent training season alone, approximately 2,000 men will

STANGARD

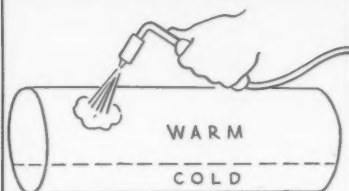
Prime Surface

COLD PLATES

Maximum Refrigeration Efficiency

THE STANGARD DICKERSON CORP.
46-76 OLIVER STREET, NEWARK, NEW JERSEY

*I do it
this way...*



Here's a quick way to check whether or not there is enough gas in the system:

Apply heat evenly up and down the receiver for a few seconds; then feel the tank with the back of the fingers. A noticeable difference in temperature can be obtained at the level of the liquid in the receiver.

Sometimes a second or third application may be necessary to determine the level of the liquid. Be sure to apply the heat evenly.

This test, of course, cannot be used on high-side float systems, or water-cooled condensers with an outer water shell.

Ed. L. Bailey, Camp Wheeler, Ga.

have attended 75 district schools. Duration of these schools varied from a few days up to one month and they offered highly organized instruction in fundamental and advanced classes in both household and commercial service work under supervision of experienced factory and district instructors.

More than 5,000 special primary and post-graduate courses have been distributed. The 24-lesson primary course can be taken by the students as pre-training before employment. The 12 lesson post-graduate course is designed for experienced men. Here again the objective is the thorough training of manpower in the shortest space of time.

Having learned the value of this service training program in 1942, when Frigidaire's wholesale education movement first got under way, the dealers quickly cooperated to help make this new concerted effort successful. Although the training program was essentially for the winter months to prepare for the critical warm-weather periods, requests for the service correspondence course lessons were continued throughout the year. Both day and night classes were held and numerous dealerships used newspaper advertising to enlist men for training and service work.

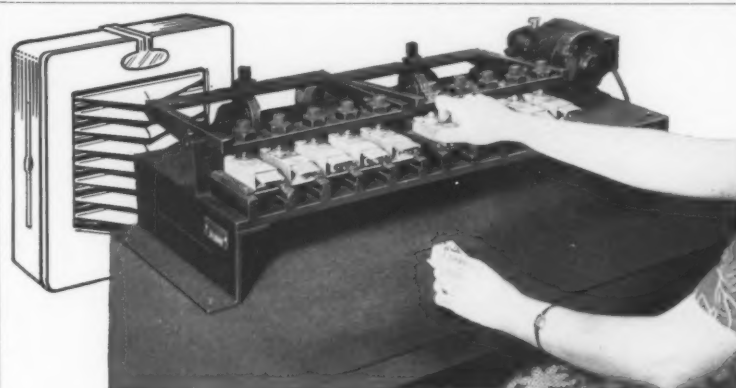
PRICE LAW CHANGED

The OPA regulation (MPR-165; Services) establishing maximum prices for services has been substantially simplified and reduced in size by a general revision and simplification of its provisions. Practically all services that previously were under the General Maximum Price Regulation have been brought under the revised services regulation, which become effective August 1.

In general, few changes are anticipated in the maximum prices already

established, since the March, 1942 base period is retained. However, maximum prices figured on the basis of a "similar" service, a competitor's offering price, or a price adjusted according to the seller's price differentials must be redetermined, since these pricing provisions have been deleted.

All sellers whose prices are changed by the revision, and all those who come under the regulation for the first time, must file a complete statement of their maximum prices with OPA by Sept. 1.



"RUN IN" LIKE A QUALITY MOTOR CAR...

8 EXCLUSIVE FEATURES OF WHITE-RODGERS HYDRAULIC-ACTION TEMPERATURE CONTROLS

1. May be mounted at any angle or position, above, below or on level with control point.
2. Hydraulic-Action Principle incorporating solid-liquid filled bulb and capillary provides expansion force comparable to that of a metal bar.
3. Diaphragm motion uniform per degree of temperature change.
4. Power of solid-liquid charge permits unusually sturdy switch construction resulting in positive contact closure.
5. Heavier, longer-wearing parts are possible because of unlimited power.
6. Dials are evenly and accurately calibrated over their entire range because of straight-line expansion.
7. Controls with remote bulb and capillary are not sensitive to change in room temperature. Accuracy of control is not affected by temperature changes in surrounding area.
8. Not affected by atmospheric pressure. Works accurately at sea level or in the stratosphere without compensation or adjustment.



to assure accurate performance
the moment it is installed

Hour after hour this specially designed cycling machine breaks in White-Rodgers control-switch mechanisms. Each is operated for not less than five hundred cycles to assure smooth, uniform contact action.

Just another reason why White-Rodgers Controls are accurate when you install them—need no recalibration due to flexing of moving parts or seating of bearing surfaces.

Specify White-Rodgers to assure dependability and freedom from trouble.



**WHITE-RODGERS
ELECTRIC CO.**

1225G Cass Ave.

St. Louis, Mo.

Controls for Refrigeration • Heating • Air-Conditioning

The MARKET Place

The rates for this department are as follows: minimum charge—\$2.00, 25 words. Each additional word, 10c.

Box type or all capitals: minimum charge—\$3.00, 25 words. Each additional word, 15c.

Box number or address not included in word count. All classified advertising payable in advance.

Address all communications to this department:

**CLASSIFIED ADVERTISING
DEPARTMENT
THE REFRIGERATION INDUSTRY
812 HURON ROAD
CLEVELAND 15, Ohio**

HELP WANTED

ENGINEER with testing laboratory experience. Only interested in man with good background. Location middle west. Fine opportunity for future promotion, great post war expansion plans under development. Must furnish good reference and be available at once. Advice draft status and give complete details of past experience in first letter. Write Box B66, Refrigeration Industry.

SHOP SUPERINTENDENT, must have ability to train and handle men. Thorough knowledge of compressor rebuilding, motor repair, and general shop practice required. Permanent position, well established organization. Advise experience and salary requirements first letter. Box B69, Refrigeration Industry.

Budget . . Continued from page 17

largely to adjust monthly variations into the budgetary picture.

You can't set a figure for a certain period and split it up monthly, because such estimates may be thrown out of focus by month-to-month variations or seasonal fluctuations common to this business. Budgetary estimates should be checked periodically with actual results as shown on the profit-and-loss statement.

The captain of an ocean liner wants to know where he is, and where he is going. Where he came from is secondary. The refrigeration dealer and serviceman should follow the same routine. His compass is a budget.

A budget gives you a better idea of spendable profit, the net after deduction of the current tax, it minimizes instability insofar as your business is concerned, and it assures you of genuine cost control, without which you won't earn maximum profits, now or in the postwar period.

Have opening for refrigeration engineer with experience in service, installation and field work.

Splendid position with growing concern with post war opportunities. Starting salary of fifty-five weekly.

Write Box A47, Refrigeration Industry.

MANUFACTURERS!

Do you now have authorized service facilities in Boston and Metropolitan area? And if so, will they be satisfactory for the post war business you are planning? If not, now is the time to get set.

Our firm have been service specialists for eighteen years and serve an area of two million people. We are well financed and have competent employees and ample facilities, shop space, trucks, stock rooms, etc. to do a fine job for you. We are familiar with air conditioning, domestic and commercial refrigeration, low temperature applications, including ice cream freezing and food freezing. We can offer complete service from application engineering to warehousing, delivering, installing and servicing on all kinds of refrigeration or other major appliances. We would appreciate an opportunity to discuss the possibility of making our service department YOUR service department.

MILLER & SEDDON CO., INC.
2089 Massachusetts Ave.
Cambridge, Massachusetts

EXCESS MATERIALS

A person who has excess materials or products on hand may obtain permission from WPB to use such materials and products himself, rather than sell them under the procedures for special sales.

WPB will grant permission for the use of excess materials under the following circumstances:

1. If the intended use of the materials would be permitted if the same materials were acquired through a special sale under Priorities Regulation No. 13.
2. If the use of the materials in production in any one plant, or the labor requirements for that production, will not interfere with war production in that plant or in any other plant located in the same area.

New Alabama Firm

The Fuller-Jones Co., managed by E. Lecureux, has recently opened offices in Florence, Ala., to do refrigeration design and consulting engineering work.

AMINCO OIL SEPARATORS



Aminco Oil Separators protect compressors by maintaining correct oil level in crankcase and by excluding oil from refrigerant stream they enable coils, condensers, valves and dehydrators to function most efficiently.

These oil separators are made for jobs from 1/2 H.P. to 120 tons and are used everywhere, ashore or afloat, where efficient refrigeration is desired.

Full descriptive bulletins on request.

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1481 - 14th AVE. DETROIT 16, MICH.
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George Boone, Rm. 736, 1775 Broadway, New York
W. H. Cody, Santa Fe Bldg., Dallas
Export: Borg-Warner, 310 So. Mich., Chicago

PORCELAIN EVAPORATORS REFINISHED LIKE NEW

We have on hand for exchange certain models of Kelvinator, Gibson, Westinghouse, General Electric, Copeland, Apex, Dayton and other evaporators. Send in your old evaporators.

Exchange Price, \$12.50

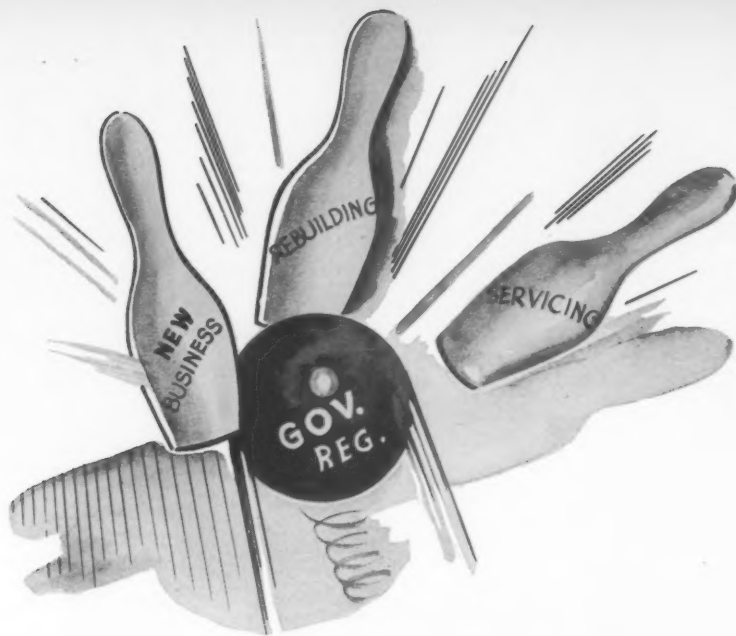
Notice—remove all fittings. No evaporators will be accepted with any welds. All prices are F.O.B. Chicago, Illinois.

We also have on hand Mullins low side float evaporators for outright sale, priced from \$15.00 up.

Send For Our Parts and Service Catalog

Acme Refrigeration Parts Co.

5217 W. Madison Street
CHICAGO 44, ILLINOIS
Telephone: Columbus 4141



Fixin' to Stay In Business

HERE'S the picture:

You're a household refrigerator dealer, averaging about 600 sales a year. With your other appliances, radios, phonographs, records, etc., you're turning in a pretty nice annual volume. Things look good.

Then . . . the War. New refrigeration production is stopped. You've got new models on your sales floor, more in the warehouse—but you can't move them until WPB gives the go-ahead. Tough, but—

There's still the used refrigerator market. You've got a separately operated service shop, one that you've been operating for about 15 years. You can do a complete reconditioning job, and merchandise the units for from \$90 to \$150 to customers who are waiting for refrigeration but can't buy new equipment.

But another government bureau slaps you down this time—OPA. Ceiling prices on used refrigerators are set so low that, when you finish your rebuilding work (especially on

When the war knocks out both new and used refrigerator selling, there are several things to do, an experience worth reading.

refrigerators with sealed units that have to be replaced) the price you are able to ask—legally—doesn't even cover the time and materials you've put into the job. So you give up on the used refrigerator end of the business—although when you do there are still enough units in your shop to give you a real headache.

Well, anyway, there's still the straight servicing end of the refrigerator business to be looked after. Your service department has been taking care of all your own users, and some of those for other dealers who don't maintain their own servicing facilities. That end of the business, at least, ought to hold its own.

But the draft takes your service men, and you can't find suitable re-

placements. So you close down that end of your refrigerator business, too.

What is there that's left for you to do?

Plenty, if you're a dealer like Louis E. Schwab, head of Schwab Electric Co. and Electrical Service Co., of Cleveland.

You can build up your service agency on all types of small appliances—radios, irons, toasters, roasters—you can widen your servicing field by doing work directly for the consumer, instead of confining your work to jobs brought in by dealers, as in the past. You can intensify your efforts in the washer rebuilding field, and you can do most all other types of major appliance repair work as well. In your dealership headquarters, you can expand your phonograph record section so that it becomes a leader in your neighborhood, you can staff the store with women, and you can use it as the sales outlet for the washers and other appliances which are rebuilt in your service



store, besides making it a down-the-street receiving and delivery station for the appliances servicing end of the business.

That's what you'd do, if you were a dealer like Mr. Schwab. For that's what he did. He had operated an appliance servicing business separately for some 15 years, specializing in work for other dealers in addition to handling all his own users. About 90% of his servicing volume had come through the dealers. When the War came, he simply changed his servicing slant, and began catering to the consumer as well.

In his sales store, he built up the record sales department, stressed efficient servicing of all types of electrical equipment used in the home, searched around for lines of products that wouldn't be so hard hit by shortages of critical materials—but he stayed in the refrigeration and appliance field. For Mr. Schwab believes that the refrigeration and appliance dealer, if he is to be a really good dealer, should be a specialist.

When he strays off into other fields, more often than not he'll lose his touch as far as refrigeration and appliances are concerned. Sticking to this line, however, isn't easy when supplies of new merchandise get scarcer every day—and when even repair parts aren't readily obtainable in quantity.

And so, with no new equipment to sell, Mr. Schwab is specializing in service—and planning for the day when there will again be new refrigerators to sell. In his service department at present are seven full-

All-Appliance servicing has become a separate business, with good prospects for the post-war period.

and part-time repair men, with an outside man who handles pick-ups and deliveries. Two full-time and one part-time employees work on washer rebuilding; two additional men devote the majority of their time to heating appliances of all types—ranges, toasters, percolators, roasters—and two men handle the radio servicing end of the operation. All of them are experienced enough on all these types of equipment so that they can step in and help if one department gets more work than it can handle efficiently. Versatility is a keynote of the Schwab operation—even the counter clerk, a woman, handles minor repairs on some small appliances between customer calls. And Mr. Schwab himself is right in the thick of things. Under the wartime arrangement, he devotes all of his working hours to the servicing operation, and leaves the sales headquarters, located some distance away, in care of Mrs. Schwab and two woman assistants.

Mr. Schwab would have liked to have been able to continue with the servicing end of the refrigerator business, too—but after his three service men in this department, one by one, left for military duty, he was forced, because of inability to obtain replacements, to abandon this part of the operation. Altogether, 12 Schwab employees are doing some rather special work for Uncle Sam at this moment, if you take in both sales and service departments. But they're not forgotten. There'll be post-war jobs

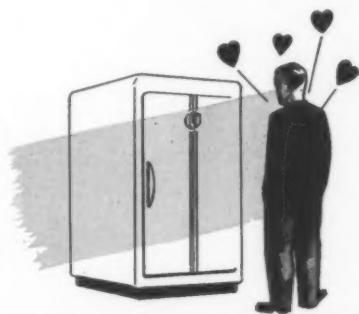


The stenographer-clerk repairs small appliances between customer calls.

for all of them with the company—and a bright future in an industry—refrigeration—that is just about ready to realize its potentialities, in Mr. Schwab's opinion.

Selling refrigeration, in post-war America, is going to require a much greater fund of technical knowledge than was the case in the past, Mr. Schwab believes. All the technical devices which the war has brought on have heightened the average person's interest in things mechanical—and he's going to want to know more about "what's inside" before he makes up his mind. Mr. Schwab's background of technical experience helped him in his selling work before the war, but he believes that this, plus the additional experience he is now amassing, will prove of even greater aid in the days to come.

In the past, Schwab Electric concentrated on the household refrigerator field. After the war, this em-



He's planning now for the day there'll be new refrigerators to sell.

phasis will be shared with commercial refrigeration equipment, and especially with frozen foods chests for all varieties of uses. There's really a field with a future, Mr. Schwab believes. He also has an eye on the suburban market, and may branch out in that direction if opportunity permits.

His servicing business? That will continue to play a major part in all Mr. Schwab's plans from now on. Post-war, he'll not only service refrigerators, he'll rebuild them, too. For a higher percentage than ever of new-refrigerator sales will involve trade-ins, and with present restrictions removed, these can be passed on down the consumer line and account for a might decent share of the overall volume. There will always be a market for used refrigerators, Mr. Schwab believes.

DISABLED VETERANS AVAILABLE FOR REFRIGERATION TRAINING

**Another source of Servicing Talent,
Thanks to the "G.I. Bill of Rights."**

DISABLED veterans of World War II who are eligible for pension may now be employed by refrigeration servicing organizations and given on-the-job training as part of the Vocational Rehabilitation Program of the Veterans Administration. Rehabilitation activities of the Veterans Administration were extended to include the passage of Public Law 16, the much-publicized "G. I. Bill of Rights."

Employers in the refrigeration industry who have facilities for providing this on-the-job training are advised to get in touch with the Veterans Administration field station in their state, and make arrangements for tapping this worthwhile source of manpower. Many veterans who are undecided as to the vocation they wish to follow can readily be convinced of the desirability of getting into the re-

frigeration industry, in view of both present and post-war possibilities.

While no formalized course of training necessarily must be followed, the would-be employer is required to provide the Veterans Administration with a detailed "individual training program," which outlines the phases of refrigeration servicing (for instance) in which the trainee will receive instruction, so that regular progress reports can be made.

The extent of the training period also must be decided upon before employment is begun. No course of instruction, under the law, can exceed four years in length. Reports of wages paid to trainee obtained under this program must be made monthly. The training agreement may be terminated by either the employer or the Veterans Administration on 15 days' notice.

Operation of the Vocational Rehabilitation Program has been decentralized to the field stations, of the Veterans Administration, one of which is located in each state, with the exception of Delaware, which is served by the office at Philadelphia. Planning and control features have been retained in the central office at Washington.

For further information address the Manager, Veterans Administration, nearest your location, as below:

Albuquerque, N. M.; Atlanta, Georgia; Batavia, N. Y.; Bay Pines, Florida; Boise, Idaho; Boston, Mass.; Brecksville, Ohio; Bronx, N. Y.; Cheyenne, Wyo.; Columbia, S. C.; Dayton, Ohio; Dearborn, Mich.; Denver, Colo.

Des Moines, Iowa; Fargo, N. D.; Fayetteville, N. C.; Ft. Harrison, Mont.; Ft. Howard, Maryland; Hines, Ill.; Huntington, W. Va.; Indianapolis, Ind.; Jackson, Miss.; Jefferson Barracks, Missouri; Kansas City, Missouri; Lexington, Kentucky; Lincoln, Neb.

Little Rock, Ark.; Los Angeles, Calif.; Lyons, N. J.; Manchester, N. H.; Minneapolis, Minn.; Montgomery, Ala.; Murfreesboro, Tenn.; Muskogee, Okla.; Newington, Conn.; New Orleans, Louisiana; Philadelphia, Pennsylvania; Pittsburgh, Pennsylvania; Portland, Ore.

Providence, R. I.; Reno, Nev.; Roanoke, Virginia; Salt Lake City, Utah; San Francisco, Calif.; Seattle, Wash.; Sioux Falls, S. D.; Togus, Maine; Tucson, Ariz.; Waco, Tex.; White River Junction, Vermont; Wichita, Kan.; Wood, Wis.

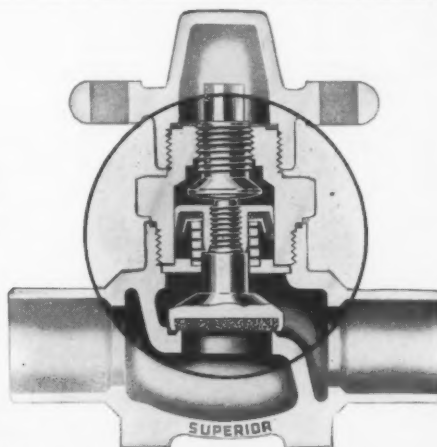
Exclusively Superior



No. 95

PRESSURE CUP VALVES

The skirt of the pressure responsive cup—acting like the piston in an automobile tire pump—automatically forms a positive pressure seal, with the valve stem in any position. Eliminates packing "drag" and leaks prevalent with conventional packed valves.



The Inside Story

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 2. Pressure responsive cup forms positive seal
 3. Metal-to-metal backseat when valve is fully opened
 4. Wrench flats for easy removal of internal assembly
 5. Spring assures positive opening under pressure
 6. Generous openings assure against pressure drop
- Available in sizes through 2½" sweat and 2" F.P.T.
If you haven't a copy of Catalog R2, request one today.

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OFFICES IN PRINCIPAL CITIES • WEST COAST STOCK: LOS ANGELES (15) • JOBBERS EVERYWHERE

ELECTRIMATIC REGULATING VALVES

Automatic control and regulating valves for Freon, Methyl Chloride and Ammonia. A large variety of sizes and types available for practically any refrigeration requirement.



WL water regulating valves for Freon, Methyl, or Sulphur. $\frac{3}{8}$ " orifice and $\frac{1}{2}$ " FPT. Brass body construction. Large capacity—no chatter.

WP water regulating valves are available in $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{3}{4}$ " FPT sizes. Brass body construction for Freon, Methyl or Sulphur. Easy adjustment.



WK water regulating valves are De Luxe Pilot Operated Modulating valves. Iron body, simple adjustment. Available in sizes ranging from $\frac{3}{4}$ " to 2" FPT.

WR regulating valves for Ammonia are diaphragm operated and highest quality corrosion resistant materials are used. Available in sizes ranging from $\frac{3}{8}$ " to 2" FPT.



Electrimatic valves are individually tested for efficient, economical operation. Trouble free performance.

Ask for a copy of our latest catalog today.

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CHICAGO 16, ILL.

Over the COUNTER

When a Job Gets "Stuck Up,"
It's Not From Pride!

JIM: "You know, Frank, trying to give these boys the right answer on some of the problems they're up against nowadays just about calls for a course in refrigeration engineering. I got my 'cold facts' the hard way, so I'm not always up on all the latest technical stuff—but it sure gives you a nice feeling to think you've helped them even a little bit with some of their problems."

FRANK: "That's right. Did you notice me talking to Bill when he came in a while ago? Seems like he usually has some problem that we can go into a huddle over."

JIM: "Yeah, I noticed you two seemed to be having quite a session. What was the problem this time?"

FRANK: "He was telling me about an old job that's been giving him a headache. For eight or ten years the thing ran along as sweet as anything ever made. But lately, when the weather turned hot, the job stuck up—and he put a new body on it and has been having trouble ever since. It's sure got him going around in circles."

JIM: "Probably can't figure out why it should act up now after being a good performer for such a long time."

FRANK: "Sure—Bill says the job is very noisy now, and runs on a head pressure that's just out of this world."

JIM: "Sounds like a lot of air in the job to me."

FRANK: "That was my idea, too—but you know Bill. He just laughed and said he purged the job good when he put the new body on, and that it wasn't air. I asked him what he did think it was, if it wasn't air—but he just scratched his head and said 'Darned if I know'."

JIM: "I've found that nine times out of 10, when a job runs hot and noisy it has air, or too much gas, or maybe not enough oil. Sometimes it's all three."

FRANK: "A lot of men who've worked for years on flooded coils with valves on the liquid and suction

line never realize how much air can get into a system when they open up the lines. It's not just a matter of cracking the flare nut a little and letting the air out. What it takes is a good two- or three-hour session of purging."

JIM: "That's a tough pill to swallow these days, when a fellow has about 50 more calls to make before he can go home to eat—but it was the best solution I could think of at the time. Somebody with a little more 'savvy' might be able to think of a better one, though."

FRANK: "That reminds me . . . Hank Brown asked me to get him that heat exchanger we talked to him about last week, for that low temperature job he's been having frost-backs with."

"He runs the evaporator flooded, and can't hold the frost line in the cabinet without starving half the coil. He just doesn't get temperature unless he has all of the coil in operation—and then he just can't hold the liquid. I advised him last week to put on a heat exchanger. 'You'll be spending half your time on that job until you do,' I told him."

JIM: "I'd think he'd want to install an oil separator, too. Otherwise, just about the time he gets the heat exchanger on he'll be having oil trouble. On those cold jobs running on vacuum, the oil won't stay put—and when it gets in the coil and congeals at the return bends it sure makes a spotty operation—with plenty of hot spots for the owner to call you back about."

FRANK: "Another thing I've been getting a lot of questions about lately is water valves. I tell the boys that a lot of the trouble they're having could be stopped by putting on pressure-regulating valves, to hold down the water pressure. In some places, the pressure is high enough to knock the valve off the line—and that's no help to good operation."

JIM: "It would help a good deal to install a strainer on the water line ahead of the valve, too."

'FREE' OIL IS EXPENSIVE

Oil and refrigerants DO mix! Separate them and they both perform better.

THE use of an efficient oil separator has become quite widespread during the last few years. In fact, it has become an essential item of installation on all low temperature units, and the advantages found in its use in this field have led to wider uses in all fields in sizes from 1/4 H. P. to 120 tons.

It has been recognized that the prime purpose for the use of an oil separator, that of maintaining the oil at correct level in the crankcase, has long since been overshadowed by the benefits obtained in preventing free circulation of the oil in the refrigerating system.

Of course, if the correct oil level is maintained, then the life of the compressor is increased, and wear and damage due to improper lubrication are eliminated. This fact is self-evident, and is of great importance when a compressor operates under conditions which promote rapid removal of oil from the crankcase, which makes difficult or impossible the addition of oil either in quantities sufficient or often enough to prevent a dangerously low level at some times. In these instances, obviously the oil separator has proved essential.

Low Temperature Uses

In the case of low temperature work, it has been found impossible to operate at temperatures considerably below zero without the use of an oil separator. The factors involved have been applied in the entire system, and have confirmed the theory that no part of the system is immune to the detrimental effects of oil in circulation.

These can best be considered by following their course throughout the system. First, low suction pressures tend to cause transfer of oil from the crankcase. Following this, if permitted, the oil passes to the condenser, where it goes into solution in the liquid refrigerant. Its action here is two-fold: first, it reduces the volumetric capacity of the condenser in that it reduces the amount of liquid by the

By Ed Kellie
Vice-President, American Injector Co.

amount of its own volume; that is, if 15% of the liquid and oil solution is oil, then only 85% can be refrigerant, and so the unit must operate that much longer in order to pass the full amount of liquid through the condenser.

Further, the solution of oil and refrigerant liquid possesses different characteristics than pure liquid refrigerant. These affect the condenser, temperature and retard the transfer of heat, with a consequent increase in high side pressures and an additional increase in running time.

The reduction in volumetric efficiency due to the presence of oil also affects the liquid line, and increases further the amount of total volume which must pass through the line. The retarding of heat transfer, of course, reduces the efficiency of heat exchangers, with obvious results.

Effect on Dehydrators

The effect of oil in solution in liquid passing through dehydrators is questioned as far as actual effect on the dehydrating agent is concerned. However, the sludge formed by temperature and moisture combined acting on oil certainly tends to plug the

filter elements of dehydrators, and coats the dehydrant crystals, reducing their effectiveness. It is a known fact that even old systems are cleaned up by an oil separator, which traps out the sludge as well as the oil.

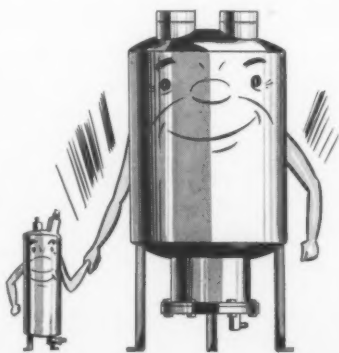
As we proceed to the expansion valve or other metering device, we find that not only is the capacity of the orifice affected from the volumetric effect of the percentage of oil passing through it, but also that, owing to the fact that the actual amount of oil content, varying as it does with varying external conditions, affects the operation of this valve in varying degrees, due both to pressure variations arising at the condenser and to varying the amount of actual refrigerant passed. This has the effect of causing an expansion valve to "hunt", instead of maintaining its proper setting.

Evaporator Efficiency

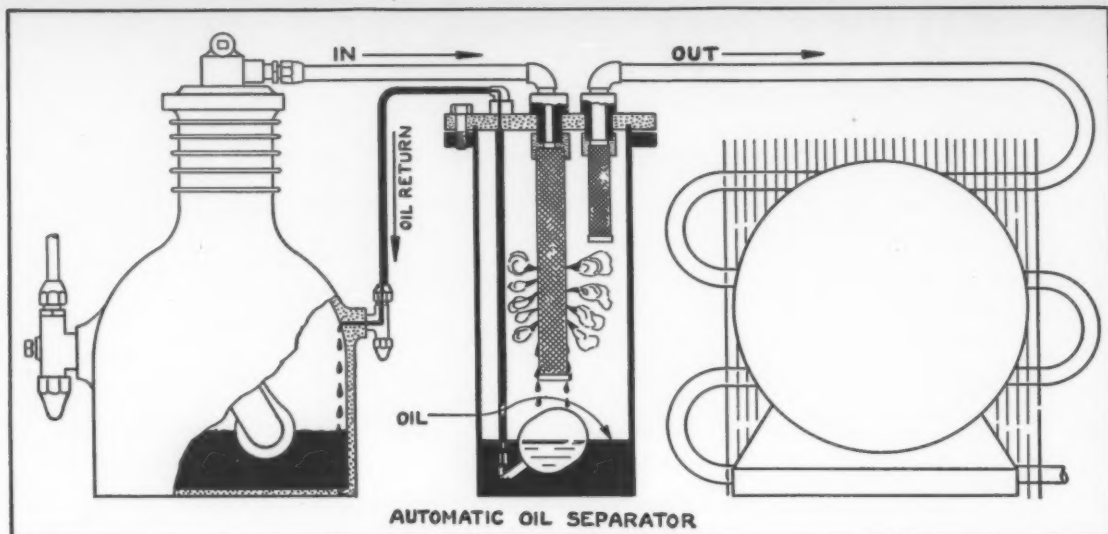
Probably the greatest lowering of efficiency occurs in the evaporator. First, the volumetric effect reduces the actual capacity available for refrigerant in the evaporator. Second, and of far worse effect, the inner surfaces of the evaporator become coated with a film of oil which acts as a very efficient insulator. This, being in the gas phase of the system, greatly reduces the rate of heat transfer of the evaporator, and results in higher temperatures in the lowside and medium to be cooled, as well as considerably longer running cycles.

The reduction in rate of heat transfer also reduces the sensitivity of thermal bulbs of both expansion valves and electrical controls. This results in wider differentials than counted on in the design of these appliances, with the result that the temperature differences between "off" and "on" cycles are relatively wider.

At this point it should be remembered that external influences vary the amount of oil going over; consequently, it is impossible to compensate for any given quantity of oil as being



Modern oil separators are used in applications ranging from 1/4 H.P. to 120 tons.



Schematic view showing location of oil separator in relation to compressor and condenser.

in circulation, especially when we consider that the amount of oil going over may vary as much as between zero and 37% at different times on the same unit. This variation is obviously too great to strike any medium of compensation.

In the Suction Line

The effect of oil in the suction line is most felt at the heat exchanger, where the insulating effect of the oil film is the same in reduction of heat transfer as it is in the evaporator.

Eventually, after sufficient oil has gone over and been trapped in the evaporator, a "slug" of oil is pulled through the suction line back to the compressor. It is probable that some good part of this "slug" goes back to the crankcase; however, it must not be forgotten that for some space of time the piston is pumping "solid" oil, with quite damaging results to the valves of the compressor, which may either become distorted or broken.

The force of this slug can be, and sometimes is, passed through the system, and is often of the magnitude of a blow equivalent to momentary pressure of 2,000 pounds per square inch. It is due to this phenomenon that failures of parts occur throughout the system, resulting in distortion of dehydrators, tubing bends, and breakage of valves, etc. The consequent overload on electric motors should certainly not be overlooked.

Copper Plating

There is another effect which is occasionally met with when oil is circulated with the refrigerant. This is the plating out of copper in the compressor. This phenomenon results from chemical reactions due to the effect of oil and moisture in solution in the refrigerant forming a salt of copper in its passage through the system. In turn, this copper is deposited under the heat of compression. It is an established fact that not one instance of copper plating has occurred after installation of an oil separator in units which previously were troubled with plating.

The fact that all of the foregoing has been proved to be true in actual operation makes it safe to state that oil should definitely be prevented from circulating through the refrigeration system, owing to its detrimental effects. The oil separator is the only fully safe way of preventing circulation. Gadgets in the discharge ports are not sufficient, as there is not efficient removal of oil unless the gases lose velocity at some point.

Operation Described

A description of the operation of the oil separator may be helpful in understanding the problem of removal of oil.

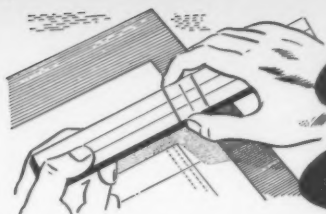
The oil separator is installed in the discharge line of the unit between the compressor and the condenser (see cut of schematic location of oil separator).

The gases containing oil in the form of fog enter the oil separator inlet, and pass through the inlet baffling. The capacity of the baffling is greatly larger than the discharge line (as is also the volume of the oil separator shell) and consequently the velocity of the gases is lowered. The oil particles, however, having more momentum and being less able to change direction than the gases, impinge on the surfaces of the baffles and drip to the bottom of the shell to stay until the oil level rises sufficiently to open the float valve, when the oil returns to the crankcase.

In leaving the oil separator, the gasses pass through another series of baffles, at which point the more finely divided particles of oil are trapped out as the gasses speed up to their original velocity. The oil-free gasses then go to the condenser.

Continuous and correct operation which can be obtained with the use of an oil separator prevents spoilage of food, loss of precious substances such as blood in blood banks, and life-saving drugs such as penicillin. In any application, the saving in current consumption alone will pay dividends.

To the service man, the oil separator offers an opportunity to increase his business and create good will by widening his circle of customers, as well by eliminating costly call-backs. This applies not only to low temperature work, but to all types of applications, on new or old refrigerating equipment.



New PRODUCTS

Compressor Control

By permitting a water-cooled compressor to operate only when water is actually flowing through it, a new compressor control developed by the Johnson Corp., Three Rivers, Mich., is said to guard against compressor damage from overheating and unnecessary waste of water, and to permit the safe use of automatic water cut-off valves. The control consists of a sight flow fitting, mounted in the water discharge pipe of the compressor, which serves as a holder for a metal electrode. When pressure in the receiver falls below a predetermined level, the pressure switch on the receiver opens a solenoid controlled valve to admit cooling water to the compressor, which is not started until water flows through it and into the sight flow, completing the

circuit with the electrode. If the water supply fails, the compressor will not be started—or, if operating, it will be stopped at once, it is claimed.

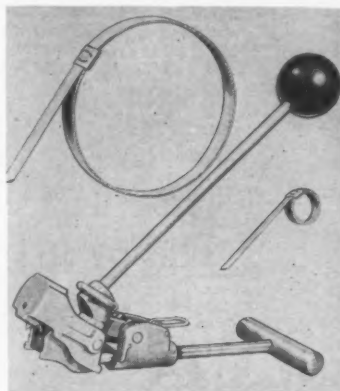
Water Cooler

Water-cooling equipment embodying a simplified method of control has been announced by Drayer & Hanson, Inc. under the trade name of "Strata-Flow." The units are designed to eliminate warm-up and "wet" systems, resulting from water in the refrigerant line. Although the coolers are based on proved cooling principles, they are said to be new in design, since continuous cooling action on the body of water in the storage tank is transmitted from the external refrigerant coil through the shell to vertical interior fins. The fins prevent swirling action and confine incoming

warm water supply to upper levels, it is claimed. Cabinet and tank models are being produced in 3½, 7 and 12½ gallon capacities.

Hose Clamp

The "Punch-Lok" hose clamp, a mechanical device for connecting various kinds of male and female fittings, special nipples, menders, or ordinary pipe to hose, has been announced by Punch-Lok Co., Chicago, Ill. The device is available from ¾-



inch to 48 inches I. D. and is said to be usable in all types of applications, from high-pressure wire woven and braided hose down to ordinary air and water hose. The hose clamps and fittings are designed to avoid injury to the hose itself, and are said to be unaffected by vibration and rough handling, once they are locked in place. In making the connection, a flat steel band is double-wrapped around the joint. After tensioning within the locking tool, the ends are locked together within a flat pressed-steel clip, and the excess band cut off flush with the clip as a safety measure. Regularly available in galvanized steel, the units may also be obtained in copper base alloy for applications in which corrosion resistance is essential.

Time Delay Relay

A compact time delay relay for surface mounting that automatically resets on power failures has been placed on the market by the R. W. Cramer Co., Inc., Centerbrook, Conn. Known as Type TD-4, the relay has a special overtravel mechanism which delays complete recycling in case of monetary power interruptions, it is claimed. Surface type mounting case is moisture proof.

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for
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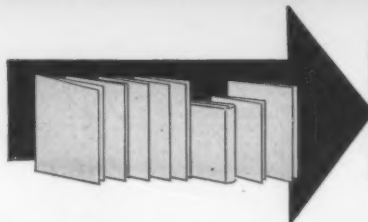


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DOOR GASKETS
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Make a habit of checking door gaskets on every refrigerator you repair...you'll earn more money and do a better service job. Worn or deteriorated gaskets cause heat losses ranging up to 9% on a high percentage of used refrigerators, and cost the owners money.

Jarrow Gaskets for all popular makes of refrigerators conform to original specifications ...are recognized as the ideal gaskets for replacement.

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*Useful
Literature*

The publications featured on this page were written by experts. They are FREE publications. To obtain these write to THE REFRIGERATION INDUSTRY, 812 Huron Road, Cleveland, 15, Ohio. If there is some delay in receiving the material requested, please understand that this is due to our operating with a minimum staff. We shall put through all requests as rapidly as possible.

28—Water Valve... A bulletin (R-1986) illustrating and describing Penn Electric Switch Co.'s new valve for numerous applications in the refrigeration field.

29—Symbols Chart... A chart of symbols for power, control and measurement, both in one line and complete wiring diagrams. Chart is in blueprint style and lacquered to withstand frequent handling. Issued by I-T-E Circuit Breaker Co. (Bulletin 4403).

30—Constant Level Oilers... Specifications Sheets (24-A, 25-A) describing automatic constant level oilers, and listing use in ball bearings, gear and pump housings, etc. Issued by Trico Fuse Mfg. Co.

31—Water Coolers... A catalog giving full information on models and performance of Drayer & Hanson's new "Strata-Flo" water coolers.

32—Heavy-Duty Heater... A 32-page catalog containing construction details, capacities, dimensions, piping and installation data on B. F. Sturtevant Co.'s new heater for heavy-duty applications in industrial heating, air conditioning, vapor absorption, drying, and other processing work.

33—Purgers... A bulletin (No. 160) describing its new Model No. 253 purger, developed by Armstrong Machine Works to overcome wear on valves and seats by minimizing pressure differentials.

34—Corrosion Resistance... A chart showing corrosion resistance of such materials as iron, steel, copper, nickel, brass, aluminum, etc., to some 150 fluids,

originally published in The Valve World, a Crane Co. publication. Reprints available.

35—Hose Clamps... A catalog describing and illustrating the new Punch-Lok hose clamp for banding, clamping, or splicing various kinds of fittings, menders, or pipe to hose. A Punch-Lok Co. release.

36—Fan Blades, Pulleys... A 4-page illustrated catalog insert outlining sizes, specifications, prices of its line of precision-balanced fan blades and single and double groove cast iron pulleys. Issued by Swift Mfg. Co.

37—Valve Do's and Dont's... Eleven tips on the handling and care of valves, graphically illustrated in a chart just issued by Reading-Pratt & Cady Division of American Chain & Cable Co., Inc. Points out the common mishandlings that reduce valve life. Printed on heavy stock for posting.

38—Catalog... A new catalog of accessories and equipment for refrigeration and air conditioning plants, issued by York Corp. Designed for finger-tip reference on accessories and supplies, ice cans and air fittings, cold storage doors, and tables and data, including sizes, weights, performance data, drawings, descriptions, etc., have been included.

39—Locker Plants... A four-part "treatise" on cold storage locker plants, covering approval procedure, layout suggestions, refrigeration calculation, and food processing procedure, prepared by the General Electric air conditioning and commercial refrigeration divisions.

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THE PRACTICAL REFRIGERATION ENGINEERING MANUAL — and REFERENCE LIBRARY

III. THE THIRD STEP IN DEVELOPING AN APPLICATION ENGINEERING PROBLEM IS TO DETERMINE TOTAL PRODUCT LOAD

CHAPTER III... PRODUCT LOAD

By

Harold Smith

AUTHOR'S NOTE:

This Manual has been written expressly to meet the needs of the many workers in refrigeration who do not have formal training in engineering.

The engineering information in these articles has been assembled from the many books on refrigeration already available. It is presented in a manner designed to enable any man with a reasonable working knowledge of refrigeration to properly select equipment for satisfactory operation and results.

All essential data—factors, rules, tables—has been combined for quick, simple reference and usage.

While these manuals do not constitute a complete course in refrigeration, attention to and use of the information presented will enable the service man to work out specifications for most types of applications.

At a later date, it is planned to provide binders for these articles, so that they may be kept in handy book form.

The product load is a very important part of the total refrigeration load figures. Frequently careful study must be made to produce accurate figures, as the nature of this load varies with the conditions and products involved.

In the most common refrigeration applications, the product load is divided into three classifications. Processing and chilling involves careful analysis, and the need of complete information regarding quantity of product processed per day and temperatures of product in and out of refrigeration. These same requirements apply with freezing and proc-

essing. The third and most simple product load involves products previously cooled and handled in storage and service, such as in meat markets, groceries and other retail establishments.

It is our intention to take up the detailed engineering problems for all of the many types of refrigeration applications in later chapters of the Manual. Our immediate study will deal with the product load in a general way.

Table "E" deals with specific and latent heat for most commonly refrigerated products.

Table "E"

Product	Specific Heat		Latent Heat of Freezing
	Above Freezing	Below Freezing	
<i>Fruits</i>			
Apples .....	.708	.39	91.5
Bananas .....	.804	.426	108.5
Berries (fresh) .....	.892	.46	124.5
Dried fruits .....	.30	.27	35.5
Other fruits (fresh) .....	.76	.41	105.5
<i>Meats</i>			
Fresh beef .....	.74	.37	97.8
Dried beef .....	.27	.21	18.5
Lamb .....	.67	.375	84.0
Pork .....	.65	.36	82.0
Veal .....	.71	.40	92.0
<i>Fish</i>			
Fresh Fish .....	.75	.40	101.0
Dried Fish .....	.57	.34	66.0
Oysters .....	.86	.45	122.0
Poultry .....	.80	.42	106.0
<i>Vegetables</i>			
Vegetables (fresh) .....	.89	.47	130.0
Vegetables (dried) .....	.29	.23	16.0
<i>Miscellaneous</i>			
Honey .....	.35	.26	26.0
Nuts (dried) .....	.26	.21	12.0

Example No. 1: A small packing house has the following daily load: 5 beef cattle—dressed, weight 700 lbs. each; 5 hogs—dressed, weight 130

is a Service Council in the area, ask that it be named the hiring agency for refrigerator repairmen; (2) impress on the local WMC "priority committee" that the refrigeration repair services merit top priority rank in getting available men.

COIL STANDARDS

A COMMITTEE appointed by E. M. Flannery of Bush Mfg. Co., chairman of the Heat Transfer Product Group of Refrigeration Equipment Manufacturers Association, is now at work in an effort to develop trade

standards and uniform testing and rating methods for heat transfer equipment used in refrigeration applications.

Chairman of the committee is C. E. Scott, manager of the industrial heating and refrigeration division of Fedders Mfg. Co. Other members include C. J. Otterholm, McQuay, Inc., Minneapolis; Otto Nussbaum, Kramer-Trenton Co., Trenton, N. J.; Hans Peterson, Bush Mfg. Co., Hartford; and S. R. Hirsch, Brunner Mfg. Co., Utica, N. Y.

The committee's aim is to bring into line, as much as is possible, methods of rating coils and blower units used by individual manufacturers. At present these vary widely, and considerable confusion has developed among prospective coil purchasers as a result.

lbs. each; 10 lambs—dressed, weight 50 lbs. each; 10 calves—dressed, weight 90 lbs. each.

It is safe to assume the heat of the dressed carcass will drop from live body heat, near 100° F., to approximately 80° F. when ready to be put in the chill room. The product load will be based on the carcasses remaining in the chill room 24 hours, and being chilled to 40° F.

Temperature of carcasses in cooler, 80°; out of cooler, 40°; temperature lowered, 40°.

5 cattle dressed, 700 lbs. each equals total weight of 3500 lbs. x .74 sp. ht. x 40° temperature reduction, equals 103,600 B.T.U.'s heat load in 24 hours.

5 hogs dressed, 130 lbs. each equals total weight of 650 lbs. x .65 sp. ht. x 40° temperature reduction, equals 16,900 B.T.U.'s heat load in 24 hours.

10 lambs dressed, 50 lbs. each equals total weight of 500 lbs. x .67 sp. ht. x 40° temperature reduction equals 13,400 B.T.U.'s heat load in 24 hours.

10 calves dressed, 90 lbs. each, equals total weight of 900 lbs. x .71 sp. ht. x 40° temperature reduction, equals 25,560 B.T.U.'s heat load in 24 hours.

Total load 24 hours in B.T.U.'s:	Beef	.....	103,600
	Hogs	.....	16,900
	Lambs	.....	13,400
	Calves	.....	25,560

Total 159,460 B.T.U.'s

159,460 B.T.U.'s divided by 24 equals 6,644 B.T.U.s per hour product load.

Example No. 2: A small freezing plant has the following daily load:

300 lbs. beef frozen each day, 300 lbs. vegetables frozen each day.

When food is frozen, it is necessary to use sp. ht. above freezing, sp. ht. below freezing, and latent heat of freezing factors as follows:

300 lbs. beef cooled from 80° to 32°, 300 x .74 sp. ht. x 48 equals 10,656.

300 lbs. vegetables cooled from 80° to 32°, 300 x .89 sp. ht. x 48 equals 12,816.

300 lbs. beef, latent heat of freezing, 300 x .74 sp. ht. x 97.8 equals 21,712.

300 lbs. vegetables, latent heat of freezing, 300 x .89 sp. ht. x 130.0 equals 34,710.

300 lbs. frozen beef 32° to 0°, 300 x .37 sp. ht. x 32 equals 3,552.

300 lbs. frozen vegetables 32° to 0°, 300 x .47 sp. ht. x 32 equals 4,512.

Total load above freezing equals..... 23,472

Total load for freezing equals..... 56,422

Total load below freezing equals..... 8,064

Total load..... 87,958 B.T.U.s

If product is to be frozen in 6 hours 87,958 B.T.U.s divided by 6 equals 14,660 B.T.U.'s per hour product load.

If product is to be frozen in 12 hours 87,958 B.T.U.s divided by 12 equals 7,330 B.T.U.'s per hour product load.

If product is to be frozen in 24 hours 87,958 B.T.U.s divided by 24 equals 3,665 B.T.U.'s per hour product load.

The above figures illustrate the great increase in load requirements when freezing is done in a short period of time.

"Life" of Ratings Set

When a preference rating (other than a "blanket rating") is being applied, or when any rating is being extended other than for replacement of inventory, it may be done only within a reasonable time after the rating was received, WPB has ruled. The general rule, as outlined in Interpretation 13 to Priorities Regulation 3, is that more than three months is considered an unreasonable delay in the use of a rating after it is issued.

Under certain circumstances, however, the "life" of a rating may be longer, or shorter, than three months. For example:

A rating assigned to a construction project is valid until the expiration date of the project, regardless of time.

A rating assigned in connection with an export license may be applied as long as the license is valid, and expires when the license expires or is revoked.

A rating applied to a long term contract is valid until all materials needed to fill the contract have been obtained from suppliers.

If the purpose for the rating as assigned no longer exists, the rating is not valid, even though it may be less than three months.

A rating extended to get material to deliver to a customer is valid according to the date on the customer's order, generally speaking.

packers. When points were taken off of meats recently, the volume jumped to where it hit a one-day high of 42,000 lbs.

In these uncertain days, meat deliveries don't often get too far ahead of requirements; however, what over-supply there is goes from the processing room up to the freezer room by means of a conveyor, where it is stored at temperatures of from 0° to 10° F. until required. Here, too, are stored such items as canned eggs, chicken livers and hearts, drawn poultry, clams and other seafoods, and frozen vegetables and fruits. There's quite a story in the Association's experience with frozen foods—but that will be taken up in a later article.

The freezer room is served by three banks of direct expansion ammonia coils—two banks six high and six wide, and one bank four high and four wide. The refrigeration for the processing room downstairs is supplied by brine circulating coils.

Since the Association has not as yet gone to refrigerated trucks for deliveries to individual cafeteria units, make-up of routes and scheduling of deliveries poses a summer-time problem. So far, however, spoilage has not been encountered to any noticeable extent; although at times, when one unit in the "chain" is having trouble with its refrigeration equipment, it may sometimes be necessary to "trade" space, temporarily, with some other unit.

Close control of quantities of foods



Frozen poultry awaiting transfer to some of the association's 60 cafeteria units.

sent to individual units also is important, for some units are equipped with complete storage and holding systems, while others (like the one in the Federal Trade Commission Building, which was designed to serve 700



Meats, fruits and vegetables come to the freezer for storage until use.

persons daily and now serves 2,000) have no holdover storage facilities, and must therefore be served on a strictly day-to-day basis.

The vegetable commissary, down the street from the meat commissary in another warehouse building, comprises two storage rooms with interior dimensions of 13 x 17 feet each, served by the same central ammonia system which supplies refrigeration to the meat and dairy products commissary. Facilities are provided for dry storage and storage of green goods, temperatures in each walk-in box being held at about 37° F. This is sufficient for only minimum requirements, however, and since additional local storage facilities are not available, a great deal of this produce must be kept in the refrigerator cars and demurrage charges paid. Shipments of this type of product are scheduled on a shuttle basis, so as to hold up the refrigerated cars as briefly as possible.

Size of individual cafeteria units ranges from those serving only a few hundred meals a day to units such as that in the Navy Department Building, which dispenses between 14,000 and 16,000 meals daily. The Navy unit has six complete service lines, in addition to two "stand-up" counters.

Refrigeration equipment here in-

cludes six walk-in colers, served by a 5 H.P. Freon condensing unit. Individual units are a dairy box, a vegetable storage box, a left-overs and general storage unit, a cook's box, a meat unit, and a garbage storage box. Besides the walk-in equipment, the kitchen here also has two six-door reach-ins, each served by a 3/4-ton unit, and an eight-door box served by a 1-ton unit, for storage of made-up salads, desserts, etc. There also are four eight-hole ice cream cabinets, one for each two cafeteria lines and the fourth for reserve storage. A bakery box and an ice storage refrigerator are served by another 1 1/2-ton unit.

Newest unit in the WRA system, located in the Treasury Department building, was installed only this spring, and incorporates a walk-in frozen foods storage compartment which is built as a sort of ante-chamber to the dairy storage section. Later articles will tell more about what Association cafeteria directors think about frozen foods, and their future plans as to sub-zero storage and other refrigerated food-service equipment.

Why the Trend Is Strong to CHICAGO SEALS and VALVE PLATES



Chicago Seals and Valve Plates make a better servicing job on all refrigerators, in less time, at less cost, at more profit...and more service men and more jobbers are finding out this fact every day.

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PRICING ON MOTORS

A new method for pricing rebuilt fractional horsepower electric motors, such as those needed now to run refrigerators and similar household appliances, has been announced by OPA.

The new method establishes retail prices for rebuilt motors of $\frac{3}{4}$ h.p. or less at: (1) 75 per cent of the list price of the nearest equivalent new motor, (2) plus an additional sum of \$7, (3) less the following allowance for the exchange, transfer or trade-in of a used motor—\$1 for $\frac{1}{4}$ h.p. or less; \$2 for over $\frac{1}{4}$ h.p. and including $\frac{1}{2}$ h.p., and \$3 for over $\frac{1}{2}$ h.p., and including $\frac{3}{4}$ h.p.

EXAMPLE: A buyer trades in a used $\frac{1}{4}$ h.p. motor on a rebuilt motor of the same size which lists at \$12 when new. The maximum price for the rebuilt motor would be established by the following steps: (1) 75 per cent of \$12 is \$9, (2) \$9 plus \$7 is \$16, (3) \$16 less \$1 trade-in allowance is \$15, which is the maximum price.

For sales of rebuilt fractional horsepower motors at levels other than at retail, the maximum price will be 85 per cent of the retail price determined by the new pricing method described above.

LUMBER CONTROL

Manufacturers of commercial refrigeration storage equipment are affected by the over-all control of lumber established by WPB, and effective on August 1. Limitation Order L-355 has been completely revised, and now covers even householders who use lumber for a shelf or bookcase, in addition to all industrial and commercial users.

Lumber is the last of the basic production materials for which a serious shortage has developed. Chief factors are:

(1) War needs rose from 5 billion bd. ft. in 1941 to an anticipated 17 billion bd. ft. for 1944.

(2) Substitution of wood for metal in the early stages of war production made huge drains on the lumber supply.

(3) Large lumber stocks existing at the outset of the war are now used up, consumption being far in excess of production.

(4) Production is limited by manpower and equipment shortages.



Dried blood plasma will be made available to the Russian armies for the first time through the use of equipment being supplied through the American Red Cross to the Union of Red Cross and Red Crescent Societies of the U.S.S.R. Heretofore the Russians have used whole blood and frozen plasma for war casualties. Four dehydrating plants of a new type are being furnished, each unit being able to process 1,000 units of plasma a day. The new units dehydrate blood plasma under high vacuum at extremely low temperature. Through the use of high vacuum diffusion pumps, the units remove both air and water vapor more rapidly and economically than has previously been possible. The principle employed is the same as that now being widely used for dehydrating penicillin in several of this country's large chemical plants.

Refrigerators with windows are a post-war possibility as an aftermath of experimental work undertaken to meet wartime requirements. Machines of the future may include almost as many glass parts as will the future house. Heat-resistant and shockproof, non-warping and unshrinkable, tomorrow's glass can be used in place of metal in many places where visibility is an advantage never before possible, where dampness would cause rust, where quick and easy cleaning is essential.

Glass ovens on ranges, glass washing machines, vacuum cleaners, cream separators, glass parts for automobiles and trains, glass fittings in textile plants are only a suggestion of new uses open to this ancient material.

A "heat pump" which would heat homes in summer and cool them in the winter, in a manner which is said to have numerous advantages over present-day heating methods, is already being field-tested in about 40 American homes and is expected to

gain much interest among electric power companies as a post-war load builder.

The "heat pump" is nothing more than a compression-type refrigeration system with provisions incorporated in the design to put to use the heat given up by the condenser instead of discarding it. It derives its name from the fact that the heat absorbed at a low temperature level is raised—or pumped—to a higher temperature level. Since this type of system is basically a refrigeration cycle, the same equipment can be used for both heating and cooling, it is said.

A "missing link" in plastics, hitherto secret, is being shown to industry by one large manufacturer. Having both moldability and great tensile strength, the new material weighs half as much as the aluminum alloy used in airplanes, and is said to have the tensile strength of structural steel. It can be molded into large and complicated shapes. Possible future uses include refrigerator and radio cabinets, filing cabinets, furniture, automobile doors and bodies, typewriter frames, and many other industrial products—perhaps even light railroad cars.

Synthetic rubber is now being reclaimed for re-use. The process uses the same machinery as is employed for reclaiming natural rubber. Synthetic rubber is relatively high in desirable properties after reclaiming, and may be manufactured into the same items for which it was previously used.

Rope that floats for from one to 10 days in fresh or salt water is the object of a recent British patent. Intended primarily for life and landing lines, the new material is said to be buoyant, and can be made luminous to facilitate night rescue work. Different fibers such as cotton, flax, hemp, sisal, and manila can be treated by the new process, it is said.



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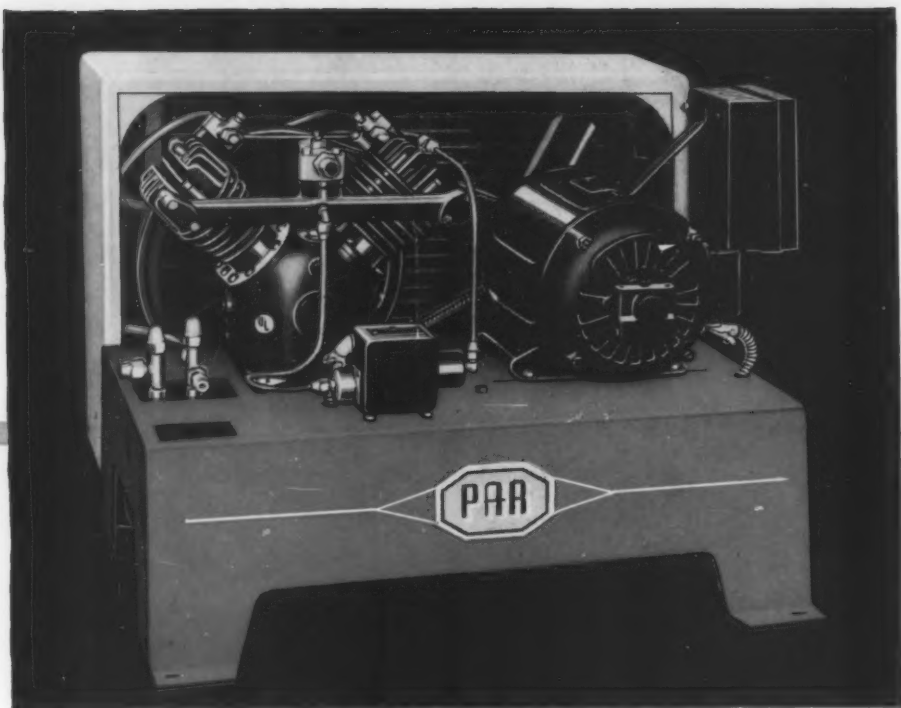
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